April 1911

MOTOR BOATING - SAILING

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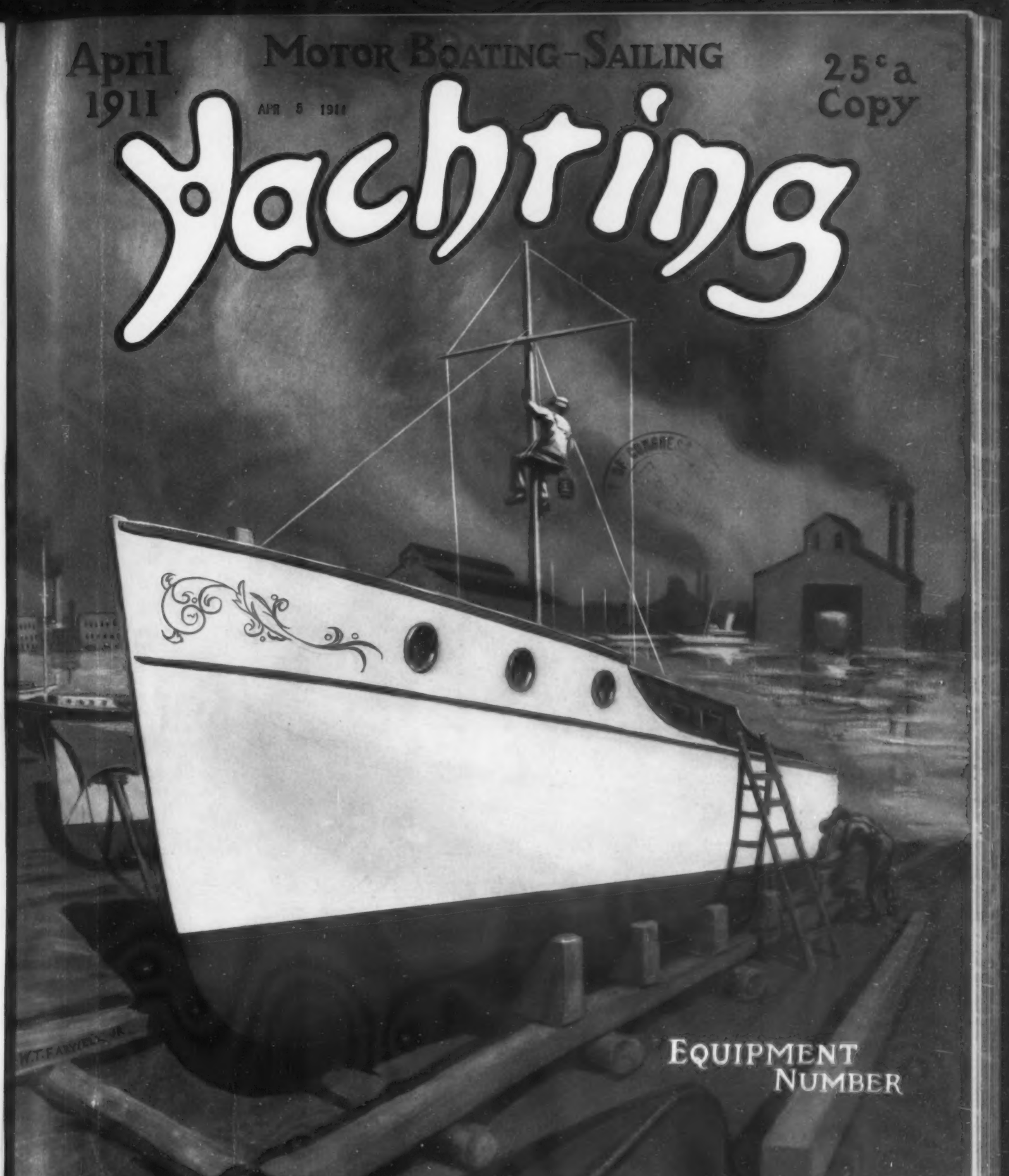
Yachting



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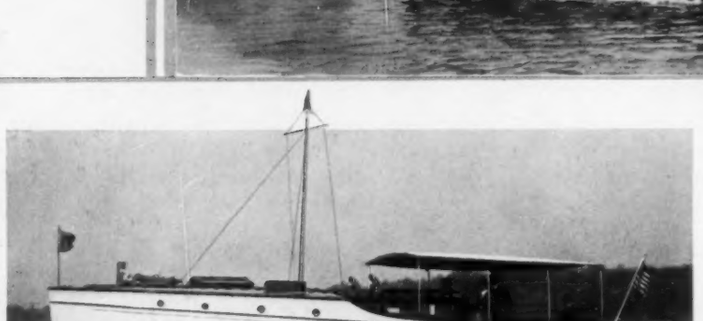

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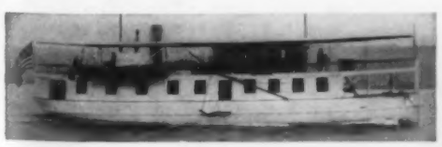
NO. 2505—FOR SALE.—Best bargain on market for raised deck cruiser of size and high class. 57 x 12.6 x 4-ft. draught. 60 H. P., 6-cylinder open base engine. Double and single staterooms, two extension berths in cabin, toilet room, galley with passageway aft and forward, and combined engine room and forecastle. Two tenders, electric lights. Large deck room. Interior finish in mahogany. Handsome, roomy and up-to-date boat. Bridge control of engine. Gielow & Orr, 52 Broadway, N. Y.

NO. 946—FOR SALE OR CHARTER.—Bargain, twin screw houseboat; very comfortable and seaworthy. Four double staterooms; two toilets, galley, etc. Two 20 H. P. engines, speed 8 miles. Gielow & Orr 52 Broadway, New York.

NO. 2991—FOR SALE.—Twin screw, Lawley built motor yacht. 112 ft. overall. Launched 1909. Speed 12 to 14 knots. Two 150 H. P. 6-cylinder Craig engines. Five staterooms, bathroom, three toilets, etc. Main saloon below. Dining saloon in deck house. One of the handsomest craft of its size. Reasonable price. Gielow & Orr, 52 Broadway, New York.

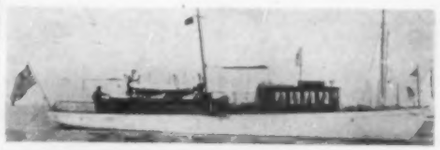


NO. 1804—FOR SALE AT LOW PRICE; WILL CHARTER. 85-ft. twin screw, motor houseboat. Fastest, roomiest and best of size. Three double staterooms, two bathrooms, dining saloon and social hall. Launch, two boats, and excellent equipment. Gielow & Orr, 52 Broadway, New York.

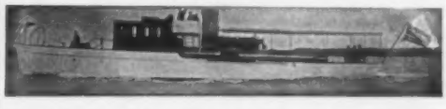
NO. 3179—FOR SALE; SACRIFICE.—One of the popular "Scout" type of express steam yachts 81 ft. overall. Speed up to 18 miles. Can be purchased at small fraction of cost. Has been well kept up. Gielow & Orr, 52 Broadway, New York.

NO. 106—FOR SALE OR CHARTER.—Herreshoff flush deck, steel, steam yacht 150 ft. overall. Speed 14½ to 17½ miles. Dining saloon in after deck house; social hall in forward one. Below forward four staterooms, two bathrooms, etc. In excellent order. Particulars from Gielow & Orr, 52 Broadway, New York.

NO. 3223—FOR SALE BY ESTATE.—Anxious to sell. Fast steel, steam yacht. 170 x 135.6 x 23.7 x 11.6-ft. draught. Speed up to 15½ knots. Dining saloon, social hall, seven staterooms, four bathrooms. Superb condition throughout. Plans, price, etc., Gielow & Orr, 52 Broadway, New York.



NO. 1075—FOR SALE OR CHARTER.—Desirable seaworthy and comfortable cruising motor yacht. 60 ft. overall. Has always given the best of satisfaction. 50 H. P. Standard engine. Dining saloon forward. Aft is double stateroom, toilet and main cabin. Large bridge deck. Gielow & Orr, 52 Broadway, New York.



NO. 2738—FOR SALE OR CHARTER.—Cruising motor yacht, 80 ft. overall. Two double staterooms, main cabin; dining room in deck house. Standard engine, 100 H. P. Speed 12½ miles. Extremely satisfactory. Gielow & Orr, 52 Broadway, New York.

NO. 1620—FOR SALE OR CHARTER.—One of the best auxiliary schooners of its size. Steel construction. Attractively finished and furnished. Four staterooms. Ratsey sails, 1909. Standard engine, 100 H. P., speed 10 miles. Launch, two boats, Acetylene lights, and hot water heating system. Prices, plans, etc., Gielow & Orr, 52 Broadway, New York.

NO. 2761—FOR SALE OR CHARTER.—Roomy and attractive twin screw motor yacht. 62 ft. overall. Built 1909. Mahogany finish throughout. Three staterooms, main cabin, and deck house. Launch, dinghy, Acetylene lights. Fine equipment. Prices, etc. from Gielow & Orr, 52 Broadway, New York.

NO. 366—FOR SALE OR CHARTER.—Owned by estate, 200 ft. overall, American built, ocean going steam yacht. best of condition throughout. Main saloon, dining saloon, smoking room, chart room, ten state rooms, four bathrooms. Offer desired. Gielow & Orr, 52 Broadway, New York.

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NO. 111—FOR SALE BY ESTATE.—Auxiliary yawl, fast under sail and under power. 54 x 34 x 12.7 x 5.6 ft. Centerboard under cabin floor. Lead ballast, copper fastened. Stateroom, toilet room, two berths and two transoms in cabin. Attractively finished. Acetylene lights. Launch, dinghy, excellent equipment. Gielow & Orr, 52 Broadway, New York.

TAMS, LEMOINE & CRANE, 52 Pine Street, New York City, Tel., 4510 John, offer for sale the following yachts, a number of which are available for charter:

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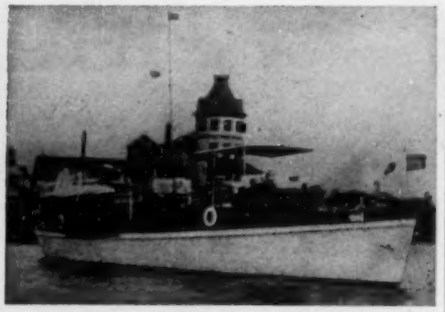
NO. 7132—FOR SALE OR CHARTER.—Unusual opportunity. 59 x 10 x 2.6 ft. raised deck cruiser; built by Lawley, 1907. Accommodations for six comfortably. 24 H. P. Lamb engine. Now in commission. Apply to Tams, Lemoine & Crane, 52 Pine St., New York.

NO. 5552—FOR SALE OR CHARTER.—Handsome and able auxiliarly yawl, keel and centerboard; 74 ft. over all, new Standard engine 1910. Two staterooms and main cabin, sleeping five. Ratsey sails, launch, dinghy, acetylene lights. Completely furnished and a very comfortable cruiser. Apply to Tams, Lemoine & Crane, 52 Pine St., New York.

NO. 1836—FOR SALE BY ESTATE.—Power house-boat 60 x 17 x 2 ft. 6 ins. draught. Roomy and comfortable craft, economical to operate. Main cabin, two double and single staterooms, bathroom, engine-room, galley and crew's quarters. Standard engine, 25 H. P.; speed 6 to 8 miles. Excellent equipment; attractively finished and furnished. Large upper deck. Will pass through Erie or Champlain canal. Offer desired. Apply to Tams, Lemoine & Crane, 52 Pine St., New York.



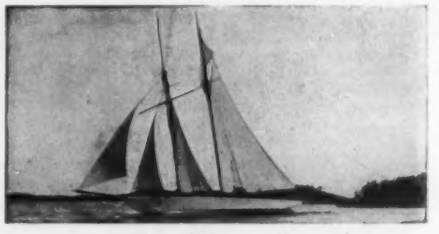
NO. 7356—FOR CHARTER.—Desirable cruising motor yacht 80 ft. over all, 76-ft. waterline, 13-ft. beam, 4-ft. draught. Has liberal accommodations consisting of two double staterooms, large saloon with two berths, bathroom, well ventilated engine-room, good-sized galley and comfortable crew's quarters. Equipped with a 6-cylinder 20th Century motor, never run except on trial trip. Speed 12 miles. Completely outfitted in every way. Carries two boats including launch. For full particulars apply to Tams, Lemoine & Crane, 52 Pine Street, New York.

NO. 7590.—Mahogany runabout, designed and built by Seabury 1908. Speedway engine rated 70 H. P., develops 90 H. P. Speed better than 18 miles. One man control. Large cockpit. Small cabin with two transom seats. Toilet room. Carries 150 gallons of gasoline. Awnings. Best possible condition. Most complete equipment. Engine in good condition. Unusual opportunity. For full particulars apply to Tams, Lemoine & Crane, 52 Pine Street, New York.

NO. 4517.—Cruising schooner 73.4 x 46 x 15 x 10.6 ft. Mahogany double planked. Oak frames. Tams, Lemoine & Crane design. Built by Lawley, 1902. Very handsome boat. Beautifully finished in mahogany. Excellent condition. 27,000 pounds outside lead, 1,000 pounds inside. Flush deck cockpit. 6.2-ft. headroom. One double stateroom. Very large main saloon with two comfortable berths. Two toilet rooms. Economical to run. Has two boats including a launch. Most complete equipment. Has cruised several times from New York up the Maine coast. Can be chartered. For full particulars apply to Tams Lemoine & Crane 52 Pine Street New York.

NO. 7392—FOR SALE.—Fast and able day cruising-launch, 62 x 12 ft. Finished in mahogany. Speed, 12 to 14 miles; two new 30 H. P. Craig motors. Available at half cost. Tams, Lemoine & Crane, 52 Pine Street, New York.

NO. 7349—AVAILABLE FOR SALE OR CHARTER.—Twin-screw power house-boat. Auxiliary sail plan. Has centerboard. 75 x 19.4 x 3 ft. draught. Two 25 H. P. motors. Two large double, two single staterooms, large saloon, bath room, unusual deck space. Complete equipment. Has made several cruises to Florida. Apply to Tams, Lemoine & Crane, 52 Pine Street, New York.



NO. 6014—FOR SALE AND CHARTER.—Auxiliary schooner. Lawley-built, 1903. 93x63x19.6 x9 ft. Flush deck; lead ballast. Two large double staterooms, saloon and bath. 25 H. P. Standard motor. Unusual sea boat; fast sailer. Won last year's race to Bermuda. For full particulars apply to Tams, Lemoine & Crane, 52 Pine St., New York.

NO. 7273 — FOR SALE.—At a very reasonable figure, modern motor yacht, 86 x 82.5 x 12 x 4 ft. Well constructed. Two saloons; two staterooms; bathroom; large bridge deck; comfortable cockpit. For full particulars apply to Tams, Lemoine & Crane, 52 Pine Street, New York.

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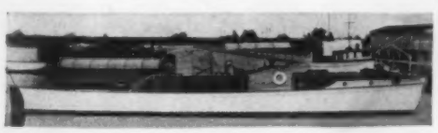
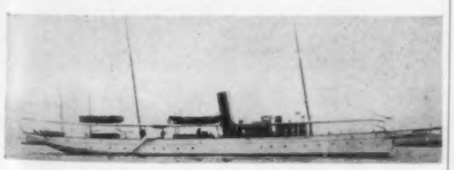
NO. 492.—Raised deck cruiser; 57 x 12.6 x 3.6 ft. Built 1908. Two staterooms, saloon, etc. Speed 12 miles. Electric lights. Fully found. Price very low. Cox & Stevens, 15 William Street, New York.

NO. 994—FOR SALE—Splendid cruising power yacht; 82.6 x 13.9 x 4 ft. Launched last August. Speed 13 to 15 miles; 100 to 125 H. P. Standard. Two staterooms, main and dining saloons, etc. Finest yacht of size and type available. Apply to Cox & Stevens, 15 William Street, New York.

NO. 154.—FOR SALE AND CHARTER—New 130-ft. steam yacht, two deckhouses. Unusual accommodations. Attractive price. Cox & Stevens, 15 William Street, New York.



NO. 1005—FOR SALE.—Splendid high speed gasoline yacht, 60 x 9 ft. Launched last August. Built in most expensive manner by well-known firm. Cabin has two extension berths, toilet room, galley, etc. Electric lights. Full particulars, plans, etc., from Cox & Stevens, 15 William Street, New York.



NO. 57—FOR SALE AND CHARTER.—Modern steel steam yacht 140 ft. Fast and in good order. Price low. Cox & Stevens, 15 William Street, New York.

NO. 4.—Fast and able Lawley schooner yacht; 75 x 50 x 16 x 10 ft draught; Ratsey sails. Completely found. Two staterooms, 10-ft. saloon, etc. Well-known craft. Cox & Stevens, 15 William Street, New York.

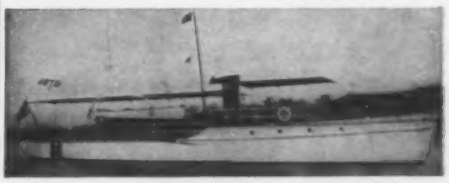
NO. 31—FOR SALE OR CHARTER.—96 x 16.6 ft. motor yacht; suitable for passenger service. Speed 12 miles; two 50 H. P. motors. Bargain. Cox & Stevens, 15 William Street, New York City.

NO. 14.—Steel steam yacht; 94 x 14 x 6 ft. Exceptional accommodations. Cox & Stevens, 15 William Street, New York.

NO. 1250.—110-ft. twin-screw power yacht; two 150 H. P. motors. Speed 13 knots. Four staterooms, bath, etc. Very able, desirable craft. Cox & Stevens, 15 William Street, New York.

NO. 910.—Best day cruiser available; 53 x 10.3 x 3 ft. Built by well-known firm in most expensive manner. Offer desired. Must be seen to be appreciated. Cox & Stevens, 15 William Street, New York City.

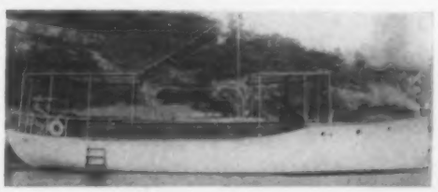
NO. 603.—Modern 85-ft. twin screw power yacht. Speed, 12 to 14 miles. Standard motors. Handsomely finished and furnished. Cox & Stevens, 15 William Street, New York City.



NO. 487—BARGAIN.—70 x 13.9 x 3.6 ft. twin-screw power yacht; Standard motors. Very roomy, able and in excellent condition. Cox & Stevens, 15 William Street, New York.

NO. 297 BARGAIN—Fast cruising power yacht; 75 x 10 x 3 ft. Speed 13-15 miles; 110 H. P, 6-cyl. Standard motor. Double stateroom, saloon. bath, etc. First-class condition. Apply to Cox & Stevens, 15 William Street, New York.

NO. 1075.—Raised deck cruiser; 40 x 9.8 x 3.6 ft. Built 1910. Best construction. Speed 10 miles; 16 to 20 H. P. Standard motor. Stateroom, saloon, etc. Up-to-date craft; fine seaboat. Cox & Stevens, 15 William Street, New York City.



NO. 1015.—Raised deck cruiser; 45 x 11 x 3.8 ft. Unusually fine seaboat. Equipped with 18 to 24 H. P. Standard. Double stateroom, saloon and galley aft of engine room. Bargain. Cox & Stevens, 15 William Street, New York.

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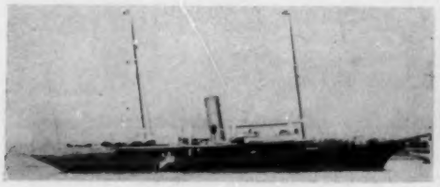
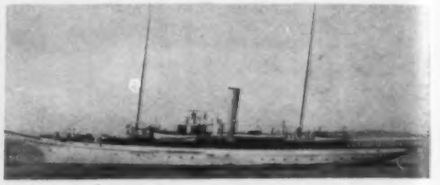


NO. 39—FOR SALE OR CHARTER.—Modern 170-ft. steel steam yacht, very attractive proposition. Cox & Stevens, 15 William Street, New York.

NO. 1170—FOR SALE OR CHARTER.—60 x 11 ft., twin screw power yacht; built 1909. Speed 10 to 12 miles; two 20th Century motors. Unusual accommodations including three staterooms, dining and main saloons, etc. Cox & Stevens, 15 William Street, New York City.

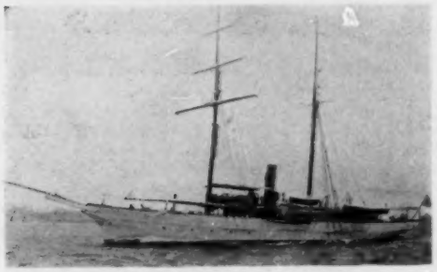


NO. 238—FOR SALE AND CHARTER.—200-ft. seagoing steam yacht, American build; to close estate. Terms very reasonable. Cox & Stevens, 15 William Street, New York.

NO. 1252.—Desirable keel cruising auxiliary yawl; 70 x 45 x 15.2 x 8 ft. Flush deck and cockpit. Sails new 1908. Speed 7 knots; Standard motor installed Fall 1909. Price attractive. Cox & Stevens, 15 William Street, New York.

NO. 781—SACRIFICE.—75-ft. Herreshoff steam yacht. Good accommodation; very economical. Cox & Stevens, 15 William Street, New York.

NO. 448—FOR SALE.—Gasoline cruiser; 64.3 ft. over all, 17.4 ft. beam, 3.6 ft. draught. Built by Lawley, 1907. Speed 8½ miles; 25 H. P. Standard. Large saloon, four staterooms, bath, etc. Very able and in A-1 condition. Cox & Stevens, 15 William Street. New York.

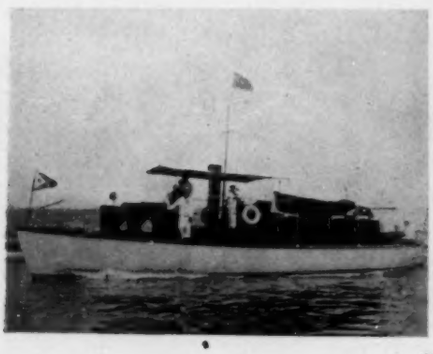


NO. 88—SACRIFICE.—Fine, able, seagoing steel steam auxiliary yacht, 140 x 20 x 12 ft. Scotch boiler. High classification at Lloyds. Excellent accommodation; fully equipped. Over $40,000 spent on improvements within last six years. Will be sold for one-fourth value to cash buyer. Great Bargain. Apply to Cox & Stevens, 15 William Street, New York.

NO. 474—BARGAIN.—Cruising motor yacht; 70 x 12.3 x 3.6 ft. Very roomy, able craft; desirable for Northern as well as Florida cruising. Speed, 9 to 10 miles; 40 to 50 H. P. Globe engine. Electric lights, bath, two toilets, etc. Fully found. Cox & Stevens, 15 William Street, New York.

FOR SALE—Cruising Motor Boat, 33½ x 8½ x 2½ ft. Hunting cabin. Sleeps five. Oak frames, cedar planking, copper fastened. Fully equipped. Four cylinder four cycle 14 h. p. Palmer engine. Speed eight miles steady. Price $1,200.00. In commission April 1st. Write for terms, W. W. Graves, Stamford, Conn.

NO. 1307—Bargain—Hunting cabin cruiser; 33 x 8 x 2.6 ft. Built 1909. Substantial construction; copper fastened. Full headroom. Speed 8½ miles; 15 H. P. Ferro 2 cyl. motor. Fully found. Owner building larger. Full particulars from Cox & Stevens, 15 William St., New York.



NO. 5470.—Modern gasoline cruiser. Dimensions: 55 ft. on deck; 11 ft. beam and 2 ft. 9 in. draft. Built by the Ruddock Company in 1908. Accommodations for four persons cruising, exclusive of crew, but can sleep eight. Pullman berths. Finished in mahogany throughout. Has a power tender and complete equipment. Motor is a 40 H. P. Jager, 6 cylinder, giving the boat a speed of twelve miles cruising, and a maximum speed of fifteen miles. Is electric lighted. Is laid up near New York Further particulars from Frank Bowne Jones, Yacht Agent, 29 Broadway, New York.

NO. 4960.—Modern raised deck cruiser, length 50 ft.; beam 9½ ft.; draught 3½ ft., built 1909. Saloon, stateroom and bathroom. Has 6 cylinder Speedway motor, speed 11½ miles cruising. Boat is in A-1 condition. To be sold through no fault. Further particulars from Frank Bowne Jones, Yacht Agent, 29 Broadway, New York.

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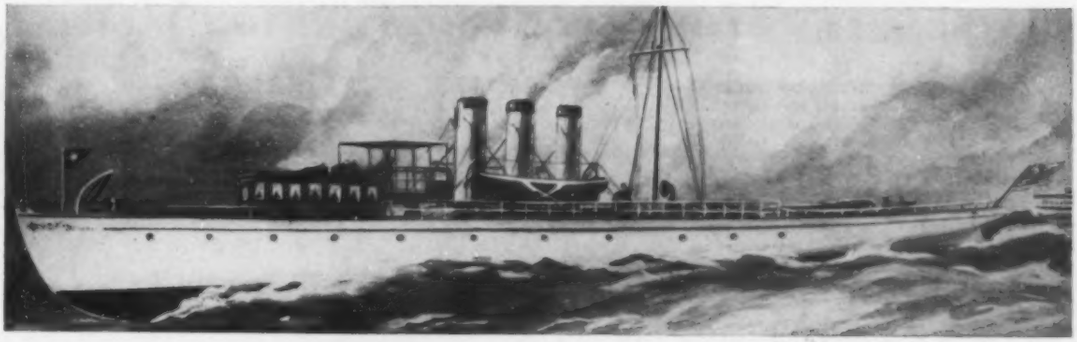

Motor boat, "raised deck type," 55 ft. long, built by Matthews Boat Company in 1910. Has toilet, galley, cabin and motor room. Extra large cockpit. Equipped with 6-cylinder, 6¾ x 8-in. "Speedway" gasoline engine, (Special), 125 H. P. Arranged for one man control. Electric lights. Fully found. Speed, 17 to 18 miles per hour. A very attractive boat. Specially adapted for day service.

Open motor boat, speed type. Length over all, 39.4ft; beams, 5.4 ft. Designed and built by Gas Engine and Power Co. and Charles L. Seabury & Co. (Consolidated) Morris Heights, NewYork City. Speed 29 to 30 miles per hour. Hull planked and finished in mahogany. Varnished inside and ouside. Equipped with 6-cylinder, 6¾ x 8 ins. speedway gasolene engine with Bosch double ignition—both high and low tension systems. Arranged for one man control. Can seat comfortably six persons, and is the best launch of its kind ever turned out. Has had very little service and will be delivered in fine order at Morris Heights.

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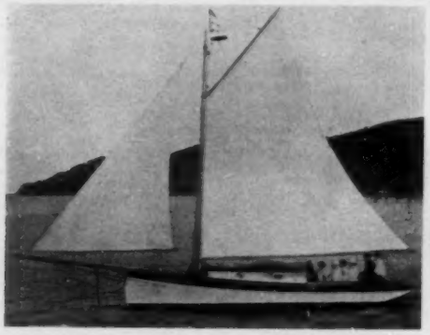

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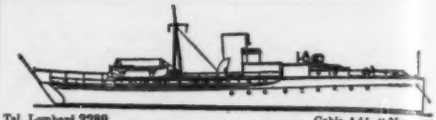

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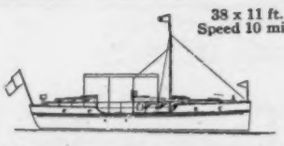

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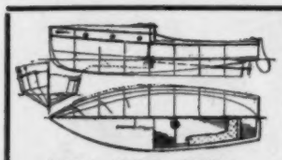

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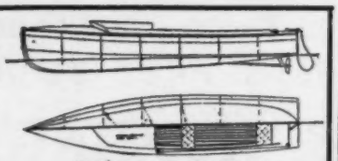

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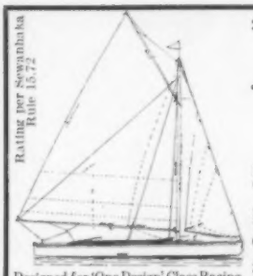

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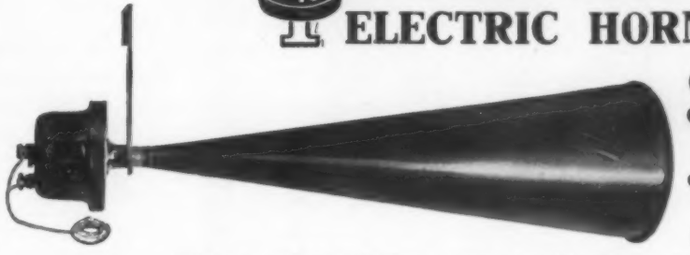

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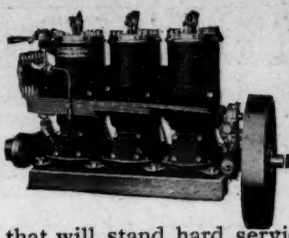

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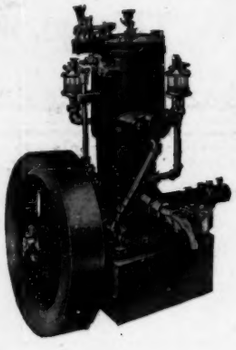

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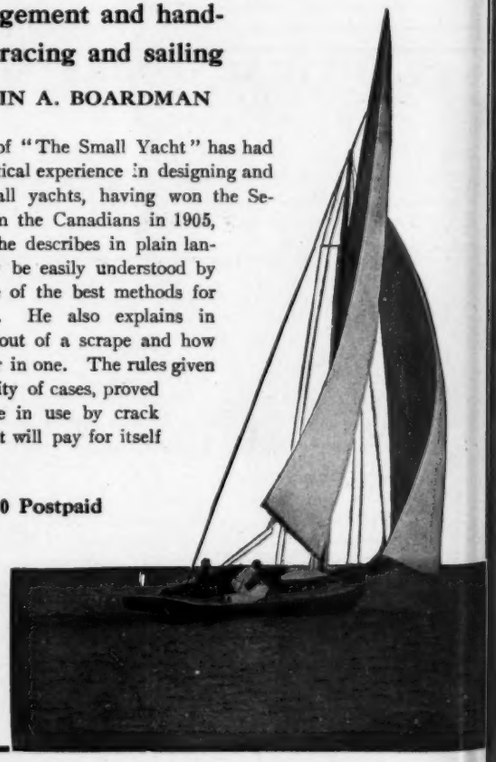

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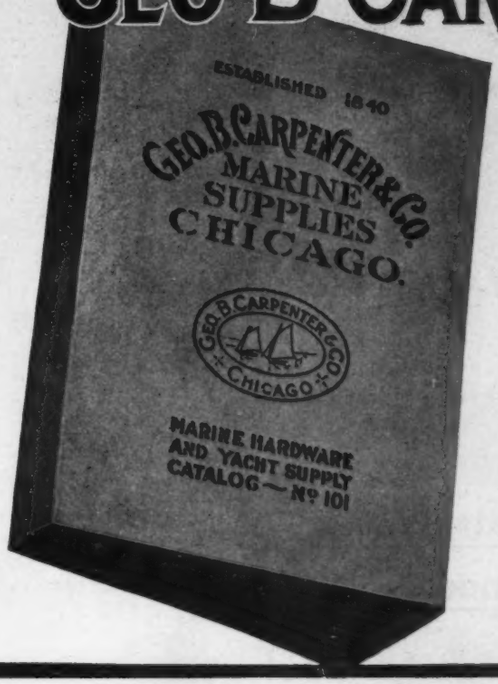

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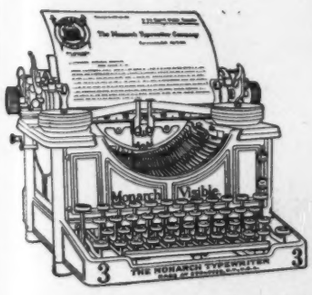

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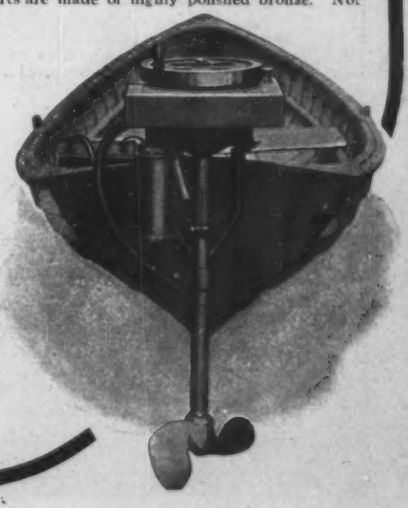

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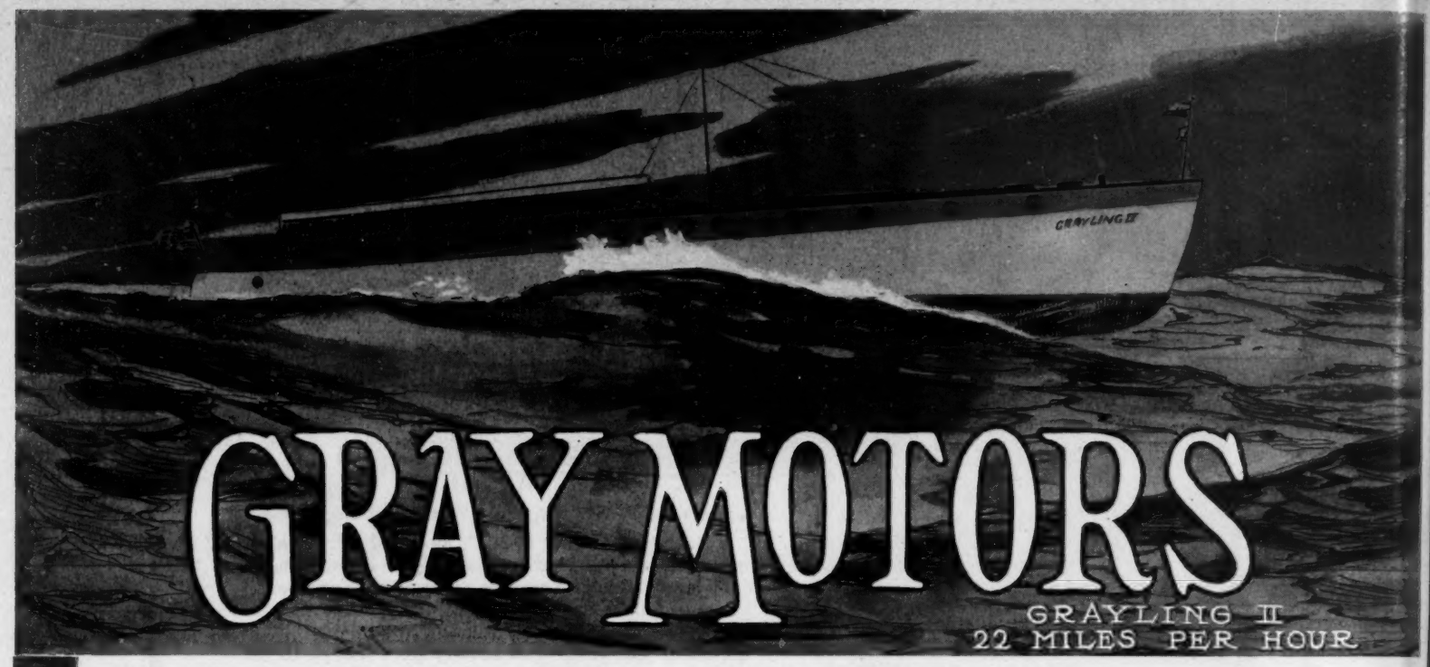

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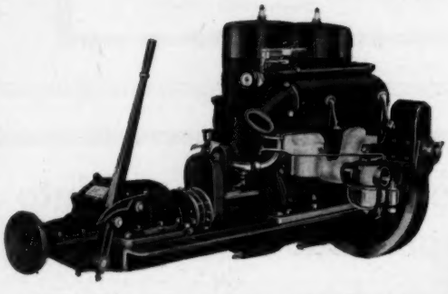

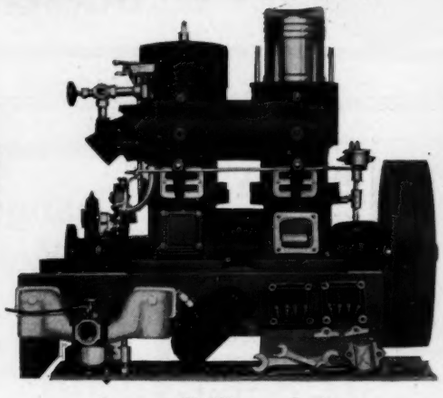

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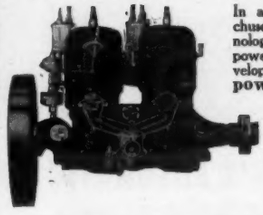

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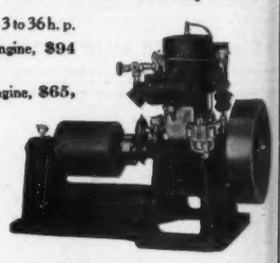

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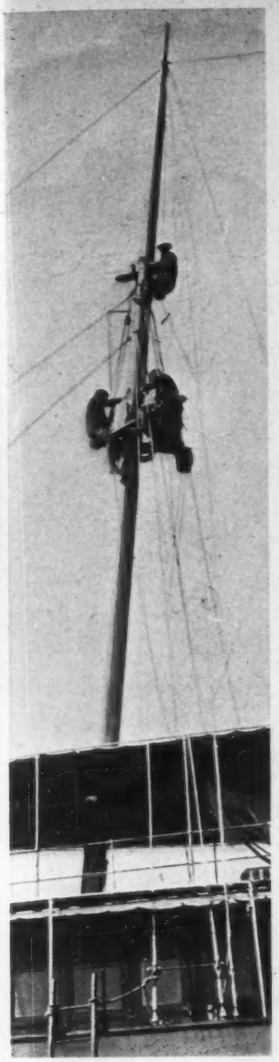

Contents—April, 1911

VOL. 9 No. 4

FRONTISPIECE	HELEN E.	
THE PROPER TYPE OF ENGINE FOR YOUR BOAT	C. VON CULIN	297
TANK INSTALLATION	MORRIS M. WHITAKER, N. A.	301
YANKEE CLIPPERS AND YANKEE SKIPPERS	FREDERICK WM. WALLACE	303
NAVIGATING EQUIPMENT FOR MOTOR BOATS	CHARLES H. HALL	306
THE MONTH IN YACHTING		309
MOORING EQUIPMENT AND GROUND TACKLE FOR SMALL BOATS	HERBERT L. STONE	311
NAVIGATION FOR THE AMATEUR—PART II.	CAPT. EDMUND MORTON	314
IGNITION AND ELECTRIC LIGHTING OUTFITS FOR POWER BOATS	WILBUR H. YOUNG	317
A WINTER CRUISE IN CALIFORNIA—PART II.	CHARLES ROYCE BARNEY	321
SOME LIGHT ON THE DINGHY PROBLEM	"NEMO"	324
THE INTERIOR EQUIPMENT OF POWER BOATS	R. M. HADDOCK, N. A.	327
LASCA CROSSING THE FINISH LINE		328–329
Photograph by F. A. Walter.		
SOUTHWARD UNDER POWER AND SAIL BY THE INSIDE ROUTE—PART III.	A. M. FARRELL	332
THE LADY MAUD, SCHOONER YACHT	W. CLARK RUSSELL	335
A NEW CLASS R BOAT FOR THE GREAT LAKES		339
A 23-FOOT SPECIAL-CLASS KNOCKABOUT		340
A 55-FOOT HIGH-SPEED MOTOR LAUNCH		341
A 21-FOOT RAISED-DECK AUXILIARY CRUISER		342
AN 80-FOOT SEAGOING CRUISER		343
EDITORIAL		344
OF INTEREST TO THE SKIPPER		346–348–350
DRIFTWOOD FROM ALONG SHORE		352

HERBERT L. STONE, Editor. LAWRENCE PERRY, Assoc. Editor.
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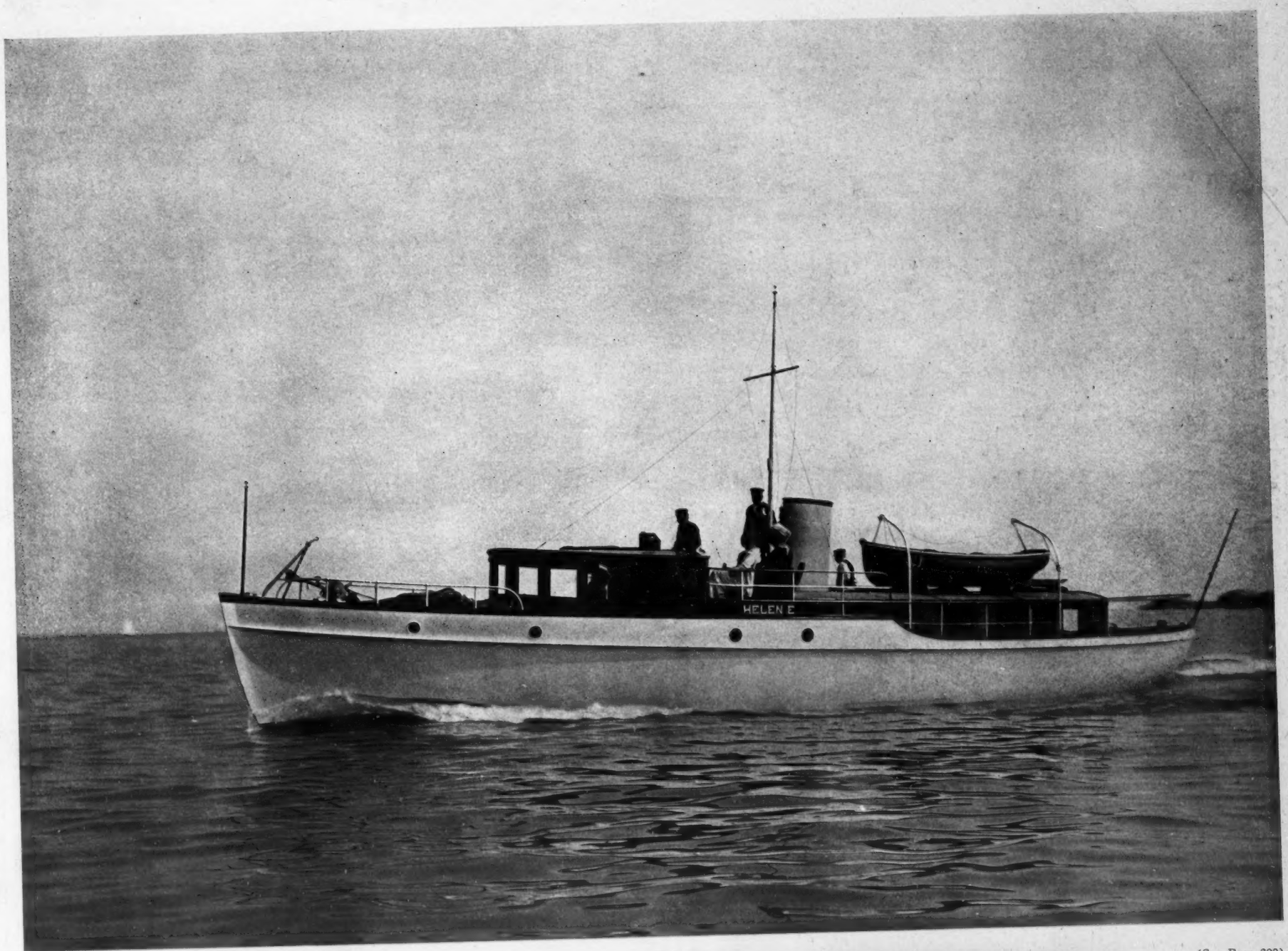

HELEN E. A SUITABLE ENGINE FOR THIS TYPE OF CRUISER WOULD BE A HEAVY DUTY, TURNING UP NOT OVER 500 REVOLUTIONS.

(See Page 299)

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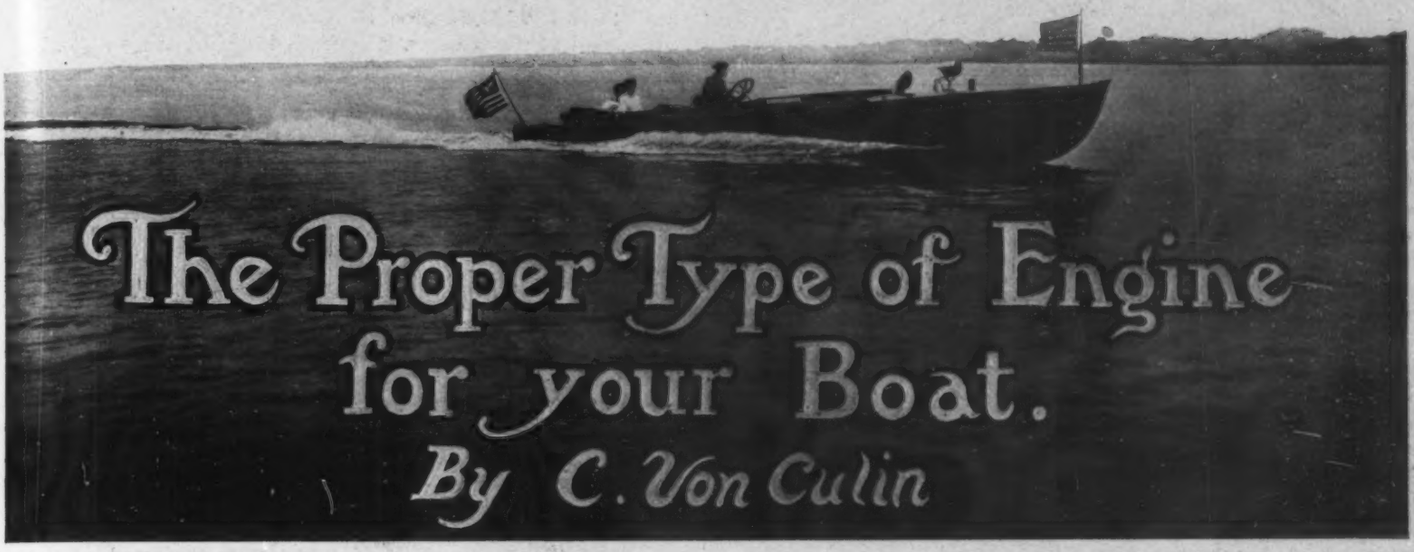


The Proper Type of Engine for your Boat.

By C. Von Culin

TYPE OF EXPRESS RUNABOUT. WITH 60 TO 70-HORSEPOWER, 4 OR 6-CYLINDER ENGINE SHE IS CAPABLE OF A SPEED OF 24 MILES.

HOW TO POWER THE VARIOUS TYPES OF BOATS SO AS TO GET THE MOST OUT OF THEM—POINTS TO BEAR IN MIND WHEN CHOOSING AN ENGINE

THE question is constantly being asked of those in a position to know something about the gas-engine industry, "What is the best gasolene motor on the market?" When a man who is able to satisfactorily answer this question is found, what he says should be very enlightening. But this is not a question of any person's individual opinion of any particular type of engine; or is it a question of personal preference for 2-cycle, 4-cycle, jump spark, make-and-break, etc., for there are any number of good engines of all types to be had. One had much better ask what type of engine is most suitable for some particular boat, specifying the use to which the boat is to be put; then he can get information that would be of some value to him. It is the same with an engine as with a boat; one cannot lay down a hard-and-fast rule as to the best type of craft, as that depends upon the use for which it is intended and the waters in which it is to be used.

It is just as essential that the engine should fit the boat into which it goes as that sails should fit a sail boat; and when we say "fit" we do not mean like an oilskin suit or a sou'wester, but like a kid glove—just right, or as near to it as human judgment will admit, keeping in mind the value of the boat and the amount one can afford to put into his outfit. One should always remember that a good engine, well selected, is economy, and that the highest priced article is not always the best, nor is the lowest priced always the cheapest.

Most people are ready to ask the opinion of others, and in the end usually suit themselves, while others jump at conclusions, like the fellow who had been persuaded to mix cylinder oil with gasolene for lubricating a 2-cycle engine, with good results, and who later contended that it was just as well to apply this method of lubrication to the 4-cycle type, saying that what was good for the goose was good for the gander.

The heavy-duty, medium and high-speed engine of both the 4-cycle and 2-cycle types each has its own particular preference for different types of boats, depending largely upon the weight and room available, and also upon the price. There is a point, of course, where the heavy, medium and high-speed engines overlap each other, according to the size and type of the boat, and also where either the 4-cycle or 2-cycle may be used satisfactorily. There is a diversity of opinion as to where and when this occurs, which is often accounted for by the favorable impression gained from the performance of some one type or make; but, laying all prejudices aside, it is always possible to find well-posted persons, equally capable of forming an opinion, who disagree as to the type of engine suited for a particular boat.

The gas engine has been brought to a high state of perfection, but the limit of its perfection or of its usefulness has not by any means been reached. No manufacturer can afford to be content and sit down and say that his product is finished. When he does, the progressive competitor slips up a cog or two on him. The new and improved accessories, which form an important part of each engine, go a long way towards its perfection, and, while the standard of perfection usually is considered the impossible, yet what appears impossible to-day may be realized to-morrow.

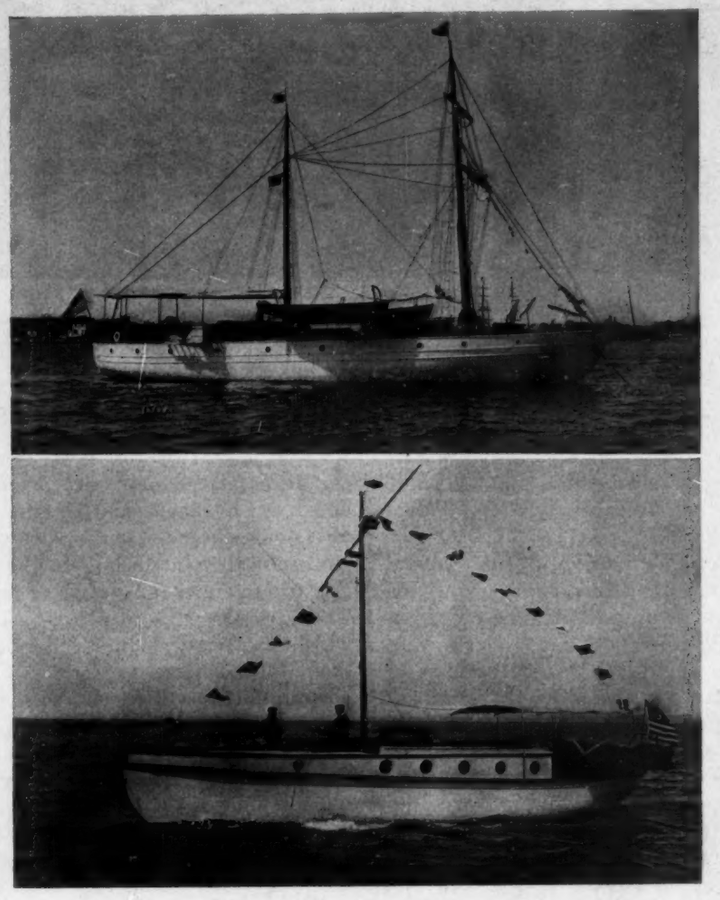
There are to-day any number of good engines of all types suitable to equip any boat, from a canoe to an ocean cruiser, and to give satisfaction, and it is the province of this short article to tell the prospective purchaser, as near as possible, the proper type of engine to choose to fit the certain standard types of boats which are in use in this country. At present a shameful waste of power is often seen, owing to the fact that a good engine installed in a good boat is not doing its most effective or economical work, and also owing to the fact that the engine and boat were designed for entirely different purposes. Every naval architect can advise a prospective purchaser on this point if his advice is heeded, though often the owner wants to have his own way through a preconceived opinion of a certain make of motor. This often re-

sults in a shameful waste of power and dissatisfaction on the part of all concerned. In treating this matter I shall take up each type of boat separately and tell the type of motor best adapted to the model and to the use for which it is intended.

THE SPEED BOAT

Any boat designed especially for speed, regardless of comfort or safety, may be termed a speed boat. It may be large or small, the smaller boats being capable of greater speed in ratio to the power used than the larger boats. A 16-foot boat making 12 miles or more an hour with a 6-horsepower engine may be correctly termed a speed boat, while a 20-footer with a 15-horsepower engine that makes 20 miles is surely in that class. For the small boat up to 25 feet, a light-weight 2-cycle engine, capable of running to 1,000 r. p. m. safely and continuously is about the right thing.

In order to get speed with a light boat built along speed lines, it is necessary to obtain revolutions. With most 2-cycle engines much depends upon the design and build of the boat, for some boats will go faster at 800 r. p. m. than at a higher engine speed; but the statement above will hold good with a speed boat of good design and light build. By using, in addition, the combination 2-port-3-port system, greater speed can be had. As to the value of the additional 2-port applied to the 3-port engine, the former gives additional power at high speed. The general method of calculating the horsepower of the 2-cycle engine is to consider the bore and stroke and the revolutions; but, in addition, cylinder compression should be considered. This does not refer to high or low compression by design, but as regards the workmanship of the engine to properly hold the compression. The expression is often used about a new engine, "Wait until she is run in," or, in other words, until the rings and cylinders have worn to a smooth fit and glazed surface through excessive friction. Such an engine must necessarily wear the cylinder oblong, and loss of compression results. If the pistons, the cylinders and rings are ground to a proper fit, there should be no "running in." The smooth surface, properly lubricated, has added to the efficiency and life of the engine by two years. The piston and design and size of the ports have considerable to do with the power, and determine the speed at which the engine develops the most power. It is, therefore, in order to get the best results, necessary to select an engine suitable for the boat.



STURDY, A TYPE OF HEAVY CRUISER.
FLORISSA, A TYPE OF CRUISER THAT CAN BE EASILY DRIVEN AT A FAIR SPEED.

For a 21-foot, V-bottomed boat, intended to make 19 to 20 miles an hour, a 25-horsepower, 2-cycle, medium to high-speed engine is about right. For a deadrise boat of the same size, built for racing, or for most of the flat or nearly flat-bottomed boats known by various names, a 3-cylinder, 30-horsepower, 2-cycle engine turning from 800 to 1,000 r. p. m. gives good results and is capable of making from 20 to 24 miles per hour. A 22-foot speed boat with a 15-horsepower, 2-cycle engine at from 900 to 1,000 r. p. m. will be about right, and if she makes from 15 to 18 miles I think will be doing well.

In regard to speed boats, it depends largely upon the ideas of the owner as to whether he wishes merely a fast boat for the power and cost or whether he is after the fastest boat of its size, regardless of power and cost, or whether he wants great power at less cost. A boat of 30 to 40 feet may be fast with anything from 35 to 75 horsepower. For this power the high-speed, 2-cycle engine meets the requirements, on account of size and weight—a 35 to 45-horsepower weighing about 300 pounds, while a 70 to 75-horsepower can be had weighing about 450 pounds for very light construction. For heavier hulls, heavier engines can be used. For heavier speed boats the same power could weigh from 800 to 1,000 pounds. For high-speed, continuous work the best engine is none too good.

Where extreme speed 4-cycle engines are preferred, of about the same power and the same number of revolutions per minute, a compact, light-weight, high-grade engine should be used weighing from 600 to 800 pounds. For extreme high-speed boats with 4-cycle engines of from 200 to 400 horsepower, power plants are usually specially designed, and the naval architect designing the boat furnishes specifications, weight, power, etc.

SEMI-SPEED BOATS

Semi-speed boats are usually built with other ends in view than simply racing, the idea being to turn out a fast pleasure boat in which due regard is paid to comfort and accommodation. They are usually built along speed lines, though with slightly more beam, and are usually very handsomely fitted up, a boat of this type lending itself to many uses, not the least of which may be fast ferry service. While the engine used need not be as light as in a speed boat, neither should it be in any sense heavy, a weight of 10 to 12 pounds per horsepower being the maximum. It is not necessary to develop as high an engine speed, from 750 to 800 revolutions being sufficient, unless particularly high speed is required.

In the smaller sizes, a 22-foot boat with a 10-horsepower, 2-cycle engine should be capable of 9 or 10 miles an hour, while a 20-foot boat with a 15-horsepower, 2-cycle engine turning from 750 to 800 revolutions should give about 15 miles. In the larger boats, a 4-cycle, high-speed engine will be found more suitable, a 35-footer with a 60 to 70-horsepower in 4 to 6 cylinders being capable of a speed of from 20 to 24 miles. Higher power might

HORNET III, AN OUT-AND-OUT SPEED BOAT. WITH 125 HORSEPOWER SHE MAKES 29 TO 30 MILES.

be carried in boats of this latter size, but they would then be classed as speed boats, accommodations being sacrificed to power.

THE FAST FAMILY RUNABOUT

Closely related to the semi-speed boat is the so-called fast family runabout, especially designed for smooth water, pleasant days and short trips, beam and seaworthiness being of less consideration than fineness of lines and speed.

A 21-foot, V-bottomed runabout equipped with a 2-cycle, 15-horsepower engine at 750 to 900 revolutions should make about 18 miles, while an 18-foot boat of the same type, with a 3 to 5-horsepower, would make from 7 to 8 miles, and with a 6-horsepower from 9 to 10, with engine turning from 600 to 800 revolutions. To get 15 miles' speed with a 25-foot boat, a 25-horsepower, either 2-cycle or a light-weight 4-cycle engine, turning from 600 to 800, should be used. For a 28-footer with 4½ feet beam, to make 18 to 20 miles would require a 35 to 40-horsepower, high-speed, of either 2-cycle or light-weight 4-cycle type. To make 16 to 18 miles with a 35-foot boat, a 4-cycle, light-weight engine of about 40 horsepower, turning from 650 to 1,000 revolutions, would be about right.

THE FAMILY RUNABOUT

This class of boat includes the various types of open boats with a speed of from 7 to 9 miles per hour, which the requirements of local waters have developed for an every-day family boat. A craft with good beam and freeboard should be selected, being looked at with a view to comfort, rather full in the bow and not too flat at the stern, and with enough sheer to make a comparatively dry boat in a heavy sea. These points should be paramount to speed. For boats of this class from 20 to 30 feet in length a suitable engine would be a 2-cycle slow or medium-speed engine turning from 400 to 600 revolutions, with either make-and-break or jump spark ignition. If the latter, one of the waterproof ignition outfits which do away with a high-tension wiring and coil will be found satisfactory. For a 20 to 25-foot boat, a 5 to 6-horsepower, single-cylinder engine will be about right, while for a 23 to 28-foot boat use an 8 to 10-horsepower, 2-cylinder. For heavy boats, where weight is not objectionable, a 4-cycle of the same power may be used.

TYPE OF V-BOTTOM SPEED BOAT.

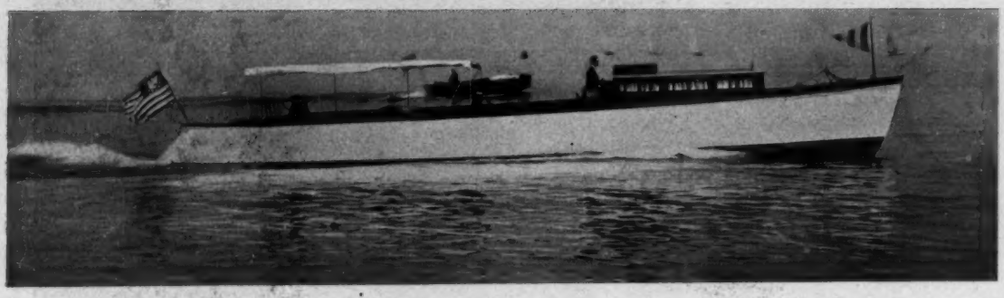
THE CRUISER

The cruiser should be primarily a fairly good sea boat, with cabin accommodations fitted for sleeping, cooking and living comfortably while cruising or wandering from place to place along the coast. She should have fair beam and good freeboard, and built to rise and fall easily in a seaway. Under this class we will not consider anything smaller than a 25-footer, as under that they will belong in the family runabout class.

For a 25-foot cruiser a suitable engine would be a 2-cycle, slow or medium-speed outfit, running from 400 to 800 revolutions per minute, according to the design, and from 5 to 10-horsepower. If a larger engine than 6-horsepower is used, 2 cylinders are best; for engines of this power the 2-cylinder type are usually much lighter, more compact, and cause much less vibration. To get 8 miles out of a 26-foot cruiser would require about a 12-horsepower, slow or medium-speed engine turning from 500 to 750 revolutions, while to increase the speed a mile would probably take a 15-horsepower engine.

For a 30-foot craft of the whaleboat type, a 15-horsepower, medium-speed, 2 or 4-cycle engine, running from 500 to 600 revolutions, would give about 9 miles an hour, and would be about the thing, while for a 35-footer with 8 feet of beam, where 10 miles an hour is desired, a 20-horsepower, 4-cycle engine turning 450 to 650 revolutions, would be about right. On a 40-foot cruiser, built with a view to higher speed, good results will be obtained with a 4-cycle engine at 650 revolutions, with power according to the speed desired.

A 50-footer, with good lines and drawing not over 3½ feet of water, should have a 25 to 30-horsepower, heavy-duty engine of 450 to 500 revolutions, with which power 12 miles might be expected. A 60-footer would require from 40 horsepower up to get a speed of 10 miles or above. A good equipment for a 100-foot cruiser would be two 100-horsepower, heavy-duty, 4-cycle engines of 325 to 350 revolu-



FAST DAY CRUISER. WITH A HIGH-SPEED, MEDIUM OR LIGHTWEIGHT ENGINE, SPEEDS OF ABOVE 20 MILES MAY BE OBTAINED.

tions. This would give her a speed of about fifteen miles.

In the cruiser class there is still another type, commonly called the fast day cruiser. By this is generally understood a pleasure craft built more on speed lines with less beam than the ordinary cruiser, and intended principally for day trips, but with a small cabin for protection from the weather or for sleeping quarters. For this class a high-speed engine of medium to light weight, either 2 or 4-cycle, would fill the requirements for boats up to 35 feet in length. Above 35 feet, 4-cycle, medium to high-speed is usually preferable. For a 40 to 50-foot boat, with 7 to 7½ feet of beam, built on these lines, I would advise two light-weight, high-speed, 4-cycle engines of 60 to 80-horsepower at 650 to 1,000 revolutions, driving twin screws (on account of light draft), and capable of maintaining the revolutions continuously. A 45-foot boat thus equipped should make about 24 miles; but the design, construction, etc., have so much to do with determining the speed that the naval architect who designs the boat is the one best fitted to estimate the probable speed and power necessary. What one person may consider fast others may not, the whole question devolving into one of the most speed for the power.

AUXILIARIES

Power for auxiliary use depends largely upon the size of the boat. For a heavy boat of extreme beam, a slow-speed, 2 or 4-cycle engine is suitable, using a large, broad-blade propeller, the two-bladed being preferable, as it extends farther beyond the deadwood than the three-bladed. On large boats where the power is to be used considerably a moderately heavy-duty, 4-cycle engine is preferable. Where space is limited, a heavy-duty, 2-cycle will answer with small or light boats. A medium-speed, 2-cycle engine will answer, especially where weight is a consideration.

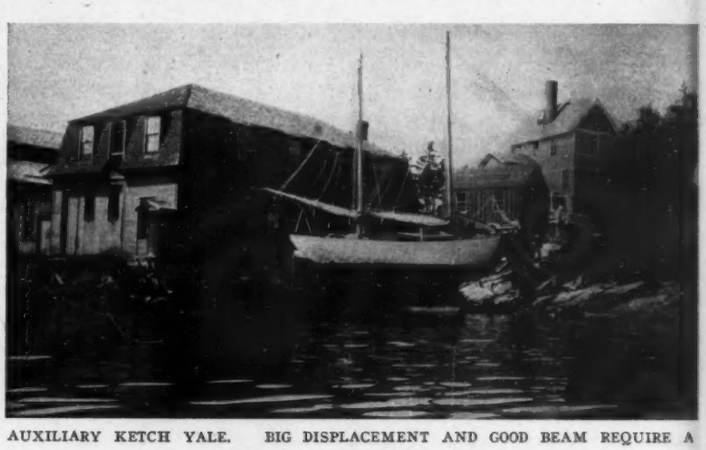
One is often led astray in selecting an engine for auxiliary use by seeing the way a small tender will tow a large boat. It should be remembered that, while a small engine of 2-horsepower in a tender will tow quite a large boat at a surprisingly fast speed, the same engine installed in the larger boat would not produce nearly the same speed.

THE VALUE OF VARIOUS TYPES OF ENGINES

The value of various types of engines for special classes of work is seldom understood or taken into consideration by the novice, and for that reason I will give a general summary of the specific uses for which the various types are designed.

The term heavy-duty does not necessarily mean an extremely heavy weight. It may be a substantially built engine with sufficient metal to make it as durable as a much heavier weight motor, with large bearings and developing great horsepower at a low number of revolutions (the larger the cylinder the slower being the speed), the term "heavy duty" really meaning designed for heavy, slow speed and continuous work. Extremely heavy-duty engines usually run from 350 to 400 revolutions, according to the size of cylinders.

The moderately heavy-duty, 4-cycle engines range from 5 to 120-horsepower, developing their power at from 300 to 500 revolutions. This class of engine is suitable for hard, continuous work in medium to large cruisers, for towing and auxiliary use, and for turning a large propeller. Medium-speed, 4-cycle engines running at from 600 to 700 revolutions are suitable for small cruisers and auxiliaries, fishing boats, etc., of moderate beam. High-speed, 4-cycle engines are designed to run at 750 to 1,200 revolutions or higher, and are particularly suited for speed boats,



AUXILIARY KETCH YALE. BIG DISPLACEMENT AND GOOD BEAM REQUIRE A HEAVY-DUTY, SLOW-SPEED ENGINE.

fast cruisers, etc., especially for boats requiring 75 horsepower and upwards.

A heavy-duty, 2-cycle engine is one that is designed to develop its rated power at 400 revolutions, but is capable of running up to 500 or 600 without falling off in its power. This means an engine with large bore and stroke, large bearing surfaces, crankshaft, connecting-rod, etc. Where the ports have been especially located to develop the power at low speed, such an engine may be run without a load at the higher speed, but when coupled to the propeller will not develop the power at this speed. Neither will the high-speed, 2-cycle engine run as well at low speed and give the power as in a special designed slow-speed engine. A 2-cycle engine has an economical speed at which it can be run to get the best results, and it is advisable to select an engine which is designed to run best at a speed most suited to the boat in which it is to be installed.

A CRUISER FOR ALL-ROUND USE. WITH SLOW OR MEDIUM SPEED ENGINE OF MODERATE HORSEPOWER 10 MILES OR BETTER MAY BE OBTAINED.

Tank Installation

IMPORTANCE OF A PROPER FUEL TANK EQUIPMENT—PRECAUTIONS TO BE OBSERVED IN INSTALLATION—WATER AND WHISTLE TANKS

By MORRIS M. WHITAKER, N. A.

THE general run of motor-boat owners either take too many and unnecessary precautions in regard to their fuel supply or else go to the other extreme and exhibit a degree of carelessness in this important particular which only the absence of a fool-killer on board saves from an untimely end. Those who have had considerable experience with the use of gasolene have a wholesome respect for it; but, at the same time, through their knowledge of the laws governing it, do not fear it when properly handled. It is like any other powerful instrument or machine; under control, it is an obedient servant, but loss of control is likely to produce serious consequences.

Gasolene as a liquid is about as dangerous as water, but gasolene mixed with air is almost as powerful—in fact, some say more powerful—than gunpowder. For this reason receptacles made for its storage should have a decent amount of attention devoted to their design, construction and installation, though some of the precautions adopted are about as useful as a fifth wheel.

In the early days, when gasolene was first introduced, the elaborate precautions taken would be smiled at now, for methods of simplification of installation have naturally come with wider use of gasolene engines. In the old days copper tanks, with elaborate drip pans, ventilators, strainers, screens, etc., were considered absolutely essential, and in many cases the piping between tank and motor was run through the bottom and outside along the keel to a point close under the carburetor, at which point it was brought back through the hull and up to the carburetor, the builders probably not realizing that the majority of leaks in the gasolene system occur either close to the tank or close to the motor, and that there is little possibility of leakage in a straight line of piping, where there are few joints, and these well made up and soldered. The placing of the pipe outside unnecessarily exposes it to breakage in case the boat should take bottom. The writer knows of a cruising boat, which made a long and difficult sea voyage, which was piped in this way. This boat had a gasolene tank located in the bow. The constant pounding of the boat in the heavy seas loosened the piping close to the tank where it came out of the bottom, with the result that when the engineer ran low on gasolene, depending upon this bow tank as a reserve, he got only salt water, practically all of the gasolene having leaked away.

The British Lloyds, an association of underwriters, who for a long period have assumed an uncontroverted fatherly supervision over marine property, and whose rules the insurance companies swear by, have recently gotten out a set of regulations governing the design and construction of gasolene engines and their equipment. These rules specify that gasolene piping between tank and motor *must* be run inside the hull; and when such a body set the stamp of their approval upon such an installation it hardly behooves anyone to cavil at it. The same Lloyds rules provide that the piping shall be of soft, seamless-drawn copper tubing. This is undoubtedly the best material for piping, as it can be obtained in almost any length required and it is possible to run the piping from the tanks to the motor in one piece; but in this country, where it is difficult to get suitable fittings for connecting the pipe to the tank, the writer believes that copper piping, made to the same scantling as the ordinary commercial iron pipe, with couplings, elbows and other fittings (with the exception of unions), well screwed up and soldered, is equally good, using, wherever a union occurs, one with a ground joint and giving it reasonable attention, to see that it keeps tight.

Lloyds rules also specify that where gasolene piping is carried through a bulkhead stuffing boxes should be provided. This also is a good thing, as, should any leakage occur, it localizes it to the compartment in which it occurs. These same rules also recommend the use of seamless tanks—that is, tanks with either brazed or welded joints, the former for copper or composition and the latter for steel. My personal inclination is toward the steel, especially where the fuel is to be carried in large units, because from its nature steel is a stronger metal than copper and will stand more rough usage and pressure than will copper. To me it seems bad practice to use a copper tank containing over 50 gallons, because for tanks larger than this size swash plates and riveting become necessary, with the possibility of the rivets pulling loose under the pressure of the liquid inside. Copper is at best a soft metal, and a copper rivet has nowhere near the strength of a steel rivet, and, if steel rivets are used, there is always the possibility of galvanic action. The writer knows of one instance where a boat was equipped with large cubical gasolene tanks, with swash plates riveted with galvanized iron. The tanks were set in a copper pan, the bottom of the pan being only a few inches above the waterline. In the course of a trip South the salt water got access to the pan when the boat was in a seaway, with the result that the galvanized rivets quickly became corroded, loosened up and allowed most of the tanks' contents to flow away into the sea.

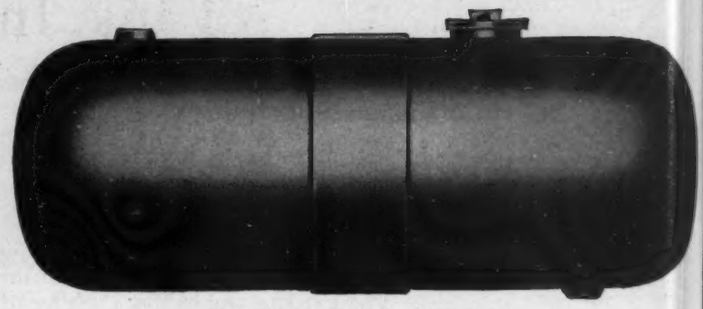
A cubical tank, by reason of its form and large, flat surfaces, requires to be very heavily constructed, well braced and supported with wooden bulkheads, to withstand the strain and not throw an undue stress on the riveting holding the swash plates in position. This means considerable care in design and installation and adds to the expense. For this reason cylindrical tanks are to be preferred, because their form makes them strong; they can be built of lighter scantling, and they stow well. Proper saddles for these tanks should be built of oak, embracing at least half the circumference. Straps set up with bolt and nut should be run over them, and, when installed, there is no possibility of their shifting. Their use does away with the necessity of a drip pan, as the tanks themselves are practically unleakable, the only possibility of a leak being through a break in the connection close to the tank. This can only happen through vibration, which can be prevented where seamless-drawn copper piping is used by throwing it in a circle or coil as it leaves the tank. This will take up any vibration and is practically indestructible. With an installation such as this there is little possibility of leakage after the gasolene is once in the tank, and the only danger in connection with such an installation lies in the matter of getting the fuel into the tank.

For this purpose the writer has used a deck plate to close the top of the tank (of fairly good diameter, say about 4 inches in the clear), closed when not in use by an air-tight cover, in the top of which are fitted two short nipples, an elbow and a check valve,

which permits air to enter the tank, but prevents the escape of gas. This provides for the fuel leaving the tank and being replaced by pure air, and there is little or no possibility of the expansion of gas in a sufficient amount to make the pressure dangerous. If one feared this possibility, it would be feasible to put also in the top of the deck plate a pressure relief valve, set sufficiently high—say 15 or 20 pounds—to relieve any pressure before it became dangerous. For filling the tank, one of the motor companies has devised a funnel, which they supply as part of their regular outfit, with a flange on the lower end designed to screw into the deck plate, making a tight connection, the funnel being of sufficient length to extend up through and well above the deck. The funnel is so arranged that, as the gasolene is poured in, there is a separate passage by which the air can escape, and thus no vapors can collect in the compartment enclosing the tank.

An installation such as this is suitable for a boat of any size where the fuel tanks are installed under a deck. It is good practice to put the tanks in a compartment separated from the living quarters by a watertight bulkhead, either at the bow or stern, preferably the stern, as this space is not available for other purposes, and with the arrangement now generally in vogue of locating the motor forward of amidships the tanks in the stern give a natural balance to the weights, tending to make the boat act well in a seaway; whereas if placed in the bow they tend to force the bow down every time the boat's center passes over a wave, making her dive deeply and wallow in a sea. In small cruisers having open cockpits, it is advisable to place cylindrical tanks under the side seats, and with this arrangement they become automatically self-draining out through the cockpit scuppers. This is rather an unnecessary precaution; but, as long as it can be obtained without loss of space or otherwise available room, it might as well be done. Another reason for placing the tanks in the stern is that the lazarette, or stern compartment, is seldom used, and is generally entered through a deck plate or hatch in the after deck. If gasolene vapor is present, through leakage in the after compartment, and this compartment is separated by a watertight bulkhead, there is little possibility of its getting into the living quarters of the boat, and its presence is quickly learned as soon as the deckplate or hatch is taken off. The natural circulation of air would very soon clear this compartment of any vapor and make it entirely safe.

The possibility of leakage and the care of a leak in the neighborhood of engine or carburetor can be well taken care of by putting a watertight bulkhead just forward and abaft of the motor, extending from the keel up to the under side of the flooring. Gasolene vapor is heavier than air, and would naturally lay in the lowest point of the boat, and I believe it is good practice to have on every motor a bilge pump, direct connected and running at all times, with suction leads to the space about the motor and to the spaces forward and aft of it. This keeps the bilge dry at all times, and, if gasolene vapor is present, after the bilge water is pumped out the pump becomes an air pump and carries away any gasolene vapor that may be present. Such an installation would require three bilge suctions; but these can be provided for by a system of valves, so that the pump will draw from each compartment as required. With an installation along the lines described, a good insurance rate can be obtained, as well as a feeling of safety that is well worth the excess of cost over the ordinary galvanized iron, cubical, tin-plate-thickness of tank which is very often installed. This light-weight galvanized-iron tank is generally found in open boats and small cruisers, and, as installed, it gets little or no attention, with the result that a majority of the accidents in connection with gasolene boats can be traced to its use. In fact, considering its general flimsy construction, it is a wonder that more accidents do not occur, though where it is installed in an open boat, with a free circulation of air, there is very little chance of trouble.



TYPE OF CYLINDRICAL STEEL TANK.

Steel gasolene tanks should be tin-lined and painted on the outside with what is commonly known as cork paint. Its application is a simple matter; the tanks, before installation, are covered with a sizing, and the powdered cork is sprinkled over their surfaces before the sizing has a chance to dry. They should then be lightly painted and later given a heavy coat. This prevents their sweating and makes them practically everlasting. This cork painting is customary for the living quarters of steel ships and keeps them free from moisture.

Galvanized iron pipe, lead pipe, block tin pipe and brass pipe of iron pipe size are most commonly used, but each of these has a disadvantage—the galvanized iron and brass because of the possibility of breaking at a joint, due to crystallization from vibration. The lead pipe is not subject to these faults, but is so soft as to be easily injured. Block tin is a little better, but suffers from the same fault as the lead pipe. Iron-pipe-size soft copper pipe resists vibration better, and should be carried from the tank to the motor, clipped to the under side of the floor beams, generally near the center line and just back of that part of the floor which is arranged to lift and give access to the bilge, and which should be in every boat. When so installed, it can be easily inspected, and is out of the way of danger of breakage.

Water tanks are more often made in cubical form and generally from galvanized iron, but the same objections to this form apply to water tanks as for fuel tanks, and a tin-lined, cylindrical tank tends to keep the water purer than a galvanized-iron tank which is built up, riveted and soldered. Water tanks are sometimes made of cedar or cypress, and, while I have never used either of these materials, the owners of boats so equipped have been very much pleased with the results. The weight, however, is greater than that of the seamless-steel tanks, and there is more possibility of leakage.

Whistle tanks must be cylindrical, on account of the pressure they are required to carry, and for this purpose a galvanized-iron water-back boiler, riveted and soldered, is probably as good as the seamless-steel tank. These tanks should be installed in the boat as close as possible to the motor and whistle, to cut down the possibility of pipe leakage, and should be equipped with a pressure indicator and at least two safety valves, especially where a pressure of over 60 or 80 pounds is carried. The writer knows of one instance where a whistle tank exploded. A few minutes previous to the explosion the pressure valve showed only about 60 lbs. After the explosion examination showed that the pressure indicator was not registering properly and that the relief valve was stuck. Undoubtedly the pressure on this tank was greatly in excess of that indicated, otherwise an explosion would not have occurred. Wherever possible it is good practice to install the whistle tank under the flooring alongside the motor, and, if the motor is equipped with a robust air pump, the size of the tank can be kept down within reasonable limits.

Yankee Clippers and Yankee Skippers

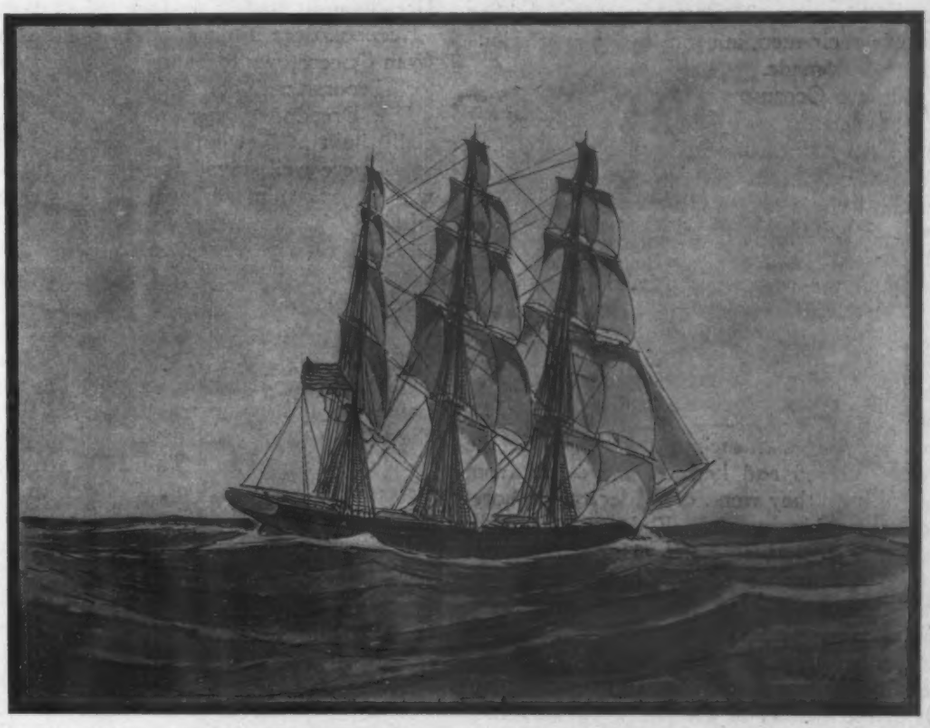
By FREDERICK WILLIAM WALLACE

"A Yankee ship came down the river,
Blow, boys, blow!
Her masts and yards they shine like silver,
Blow, my bully boys, blow!" —*Old Chantey.*

THE United States has many events and conquests to be proud of in her history since 1776, but there is no period under her constitution so interesting and fascinating to a lover of the sea as her great clipper-ship era.

Those were the days when Yankee ships and Yankee skippers held the palm for being the finest of their class afloat; when the folds of Old Glory flew, meteor-like, to the winds of the world, and the keels of her clippers ploughed an indelible furrow on the Seven Seas and in the annals of maritime history. Previous to the Civil War and the devastating Alabama, the mercantile marine of the United States reigned supreme on the high seas, and Great Britain — the first nation afloat — had to acknowledge that she was outclassed.

It is a fascinating study, and though the years have passed and the "deepwater" fleet has dwindled to a minor place among the nations, yet the memories of the ships and the men who sailed them remain for all time.



CLIPPER SHIP FLYING CLOUD, 1851. STUNSLS BOOMED OUT TO STARBOARD AND PORT.

The fame of American shipping was invested in the "clippers" and their astounding records under sail. The beginning of the clipper ship era was in the early forties, when the advent of steam called for a faster type of sailing packet in the trans-Atlantic trade. The need of speedier ships in the China tea trade also gave American shipbuilders a stimulus to build faster ships, and from these two prime causes evolved the famous Western Ocean packets and China clippers. For some years previous to this the shipbuilders of Baltimore had been constructing small vessels on a sharp model, and, as they turned out to be remarkably fast under sail, they became universally known as "Baltimore Clippers." Many of these vessels were employed in nefarious trades, and the schooners and brigs built on the Baltimore model proved suitable vessels for the slaving runs across the Middle Passage and as smugglers, etc., around the waters of the Spanish Main.

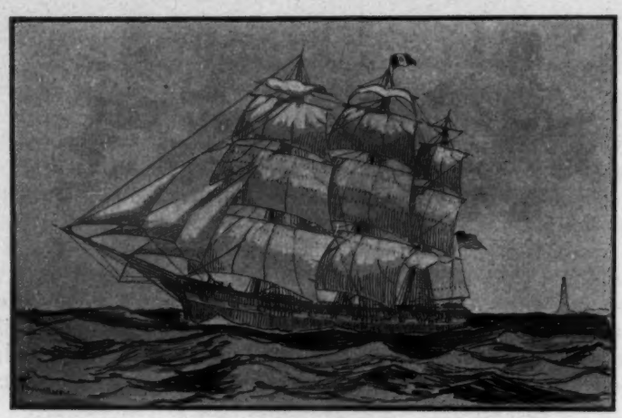
The old New Bedford whaler Canton was built in Baltimore as a merchant vessel in 1835, and she embodied many of the clipper qualities. Her length was 103 feet by 24.8 feet beam and 15.4 feet deep, with a register tonnage of 227. It will be noticed that her beam was as 1 to 4 in ratio to her length.

About 1840 the Baltimore model was adopted for deepwater ships, and the box-like hulls of the ships then in vogue were constructed with cleaner entrances, finer lines, and a good beam in proportion to length. The picture of the Sir John Franklin illustrates a vessel of that type. She sailed upon the New York-Havre route in 1840, and was credited with making quicker passages than the packets built previous to that time.

In 1846 the ship Sea Witch was launched. She was 170 feet long by 34 feet beam, and 19 feet deep, and of 890 tons. Under the command of Captain Robert Waterman she made a remarkably fast passage from New York to Hong Kong in 104 days. On the homeward run from the Canton River to New York she made the trip in 81 days. On her second voyage, in 1848, she ran the passage from Canton to New York in 77 days—the fastest passage for a homeward-bound China clipper ever made up to that date.

The Sea Witch was a full-rigged ship, with long, single topsails, and sported such "sailor teasers" and "zephyr catchers" as three skysails and royal studding-sails, and under the command of Captain Waterman she had plenty of opportunity to fly her kites. It was this characteristic for forcing and driving a ship and fearlessness in carrying sail that made the Yankee ships and the Yankee skippers famous the world over. American vessels could easily be distinguished at sea by their general air of smartness, their well-set, snow-white sails of cotton duck, well stayed masts, and by the predilection of their masters for setting or hanging on to their flying kites in a gale of wind.

Among many seafaring men the Yankee ship had a hard name, and tales of brutality and "nigger driving" upon American ships were the stock yarns of every foreigner's fo'c's'le. Sailors—by this I mean *sailors*—who have sailed in American vessels know this to be a fallacy, and they will tell you that there were no ships afloat where seamen were better treated than upon Yankee craft. It was the bungler, the lazy man, and the "sojer" who received all the bodily abuse aboard of a Yankee packet, and he generally deserved all he got. The masters paid well for good men and



PACKET SHIP SIR JOHN FRANKLIN, NEW YORK-HAVRE SERVICE, 1840.

expected the worth of their money, and if an able seaman could not "hand, reef and steer," as he signed for, the mates took the worth of his wages out of his skin. The masters spared neither themselves, their ships, nor their men, and on this their glorious reputation for fast sailing was made.

The masters on the Western Ocean packets were troubled with a particularly hard class of men as crews, and if they did not handle them with iron gloves the foremast gang would run the ship to suit themselves.

In 1848, when gold was discovered in California, the only way to reach the bonanza was by sailing around the Horn or crossing the deserts and Indian lands of the continent. The demand for ships, the high freights and the rush of passengers created an urgent call for more vessels. Clipper after clipper was built in the Down-East ports and creeks, and, launched, rigged, and with yards crossed on the stocks, sent booming around Cape Stiff on the trail of Forty-Nine.

Some of the runs made by these Cape Horners were marvelous, and the skippers in the trade vied with each other in breaking the record. The crews were hustled and kept on the move from the time they came aboard until they went, or rather ran, ashore.

The most famous of these ships was the Flying Cloud, built by Donald McKay, at East Boston, in 1851. Under the command of Capt. Josiah Creesy, she made the run from Sandy Hook to the Golden Gate in 89 days 21 hours. She ran through the Straits of LeMaire and doubled the Horn in midwinter on this passage, and on the voyage her crew were kept busy fishing spars, crossing new yards, sending up topgallantmasts and bending new sails—eloquent records of the manner in which she was driven.

The Flying Cloud ran this passage twice in 89 days, and was closely followed by the ship Andrew Jackson in about the same time. The Flying Cloud also holds a record day's run of 427 miles in 24 hours.

Donald McKay built many famous clippers between 1850 and 1860, and their names are remembered with delight by the lovers of fine ships. Among the best-known were the ships James Baines and Lightning, built for James Baines' Black Ball Line of Liverpool-Australian packets. The former vessel made the run from Boston to Liverpool in September, 1854, in the remarkable time of 12 days 6 hours. She was in ballast when she made this passage. Later, the James Baines was credited with several fast passages as a troopship in the British service, carrying troops to India in 1857, and she holds a record for a day's run of 420 miles.

The ship Lightning made the passage from Boston to Liverpool in February, 1854, in 13 days, and also made the greatest day's run for a sailing vessel—namely, 436 miles in 24 hours. Another of McKay-built ships, the Sovereign of the Seas, in 1853 ran from Sandy Hook Lightship to Mersey Bar in 13 days, or 14 days 2 hours from dock to dock. The Sovereign of the Seas was 245 feet long by 44 feet beam, and 2,421 tons register. On another occasion she made a passage of 82 days from Honolulu to New York and ran 3,300 miles in ten consecutive days. On one passage, it is said, she averaged over 18 miles an hour for 24 hours.

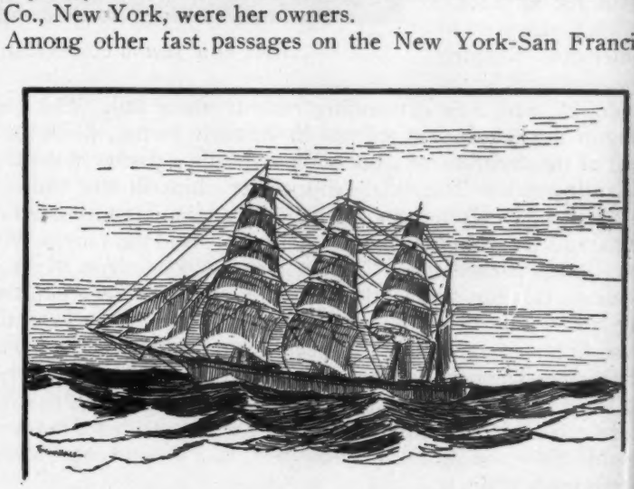
The Donald McKay, 2,636 tons, built by her namesake for Baines, of Liverpool, boasted skysail studdingsails and a main moonsail. In those days there seemed to be no limit to the amount of canvas a skipper would pile on to a ship. The crews anathematized these pocket handkerchiefs and cursed the "old man's" fads as they climbed up slender skysail poles or crawled out on precarious studdingsail booms. A forecastle story goes about of a Yankee skipper that flew a "skyscraper" above his moonsail, and the yarn is capped by the story of another one who set a "moonraker" and a "heaven-tormentor."

In 1851 the American clipper Nightingale, built at Portsmouth, N. H., while on a passage from Shanghai to Deal, ran 336 knots in 24 hours, and in December, 1854, the famous packet ship Dreadnought made a passage of 13 days 11 hours, New York to Liverpool, dock to dock. Her best passage was 9 days 17 hours from Queenstown to Sandy Hook; but fast passages were a matter of course with her, and she made them nearly every voyage.

The Dreadnought was a semi-clipper of about 1,500 tons, especially built at Newburyport for hard driving. Her masts and spars were well stayed and doubly strong, and Captain Samuels was the man to make her go. She was meant to sail in a gale of wind, for in light airs she was not fast; but in the wild westerlies, when other ships were tumbling about with a tarpaulin lashed in the mizzen rigging, hove to, the Dreadnought would be tearing along under a press of sail, and leaping from wave to wave. It has been said that the crews of other vessels could see her keel as she jumped from sea to sea. Sailors called her the "wild boat of the Atlantic" and the "Flying Dutchman," and she has been immortalized in songs and chanteys galore. Many times she beat the trans-Atlantic mail steamers, but in her fight against steam she had to give way. The fate of the other vessels of the Red Cross Line followed her, and on July 4, 1869, she dashed her bones on the rocks of Terra del Fuego.

In 1853 the four-masted bark Great Republic was launched. Her dimensions were: Length, 305 feet; beam, 53 feet; depth, 30 feet, and 3,400 tons measurement. She was the first vessel fitted with double topsails, and had four decks. Her hull was strengthened by a diagonal lattice work of iron. Her best run was 92 days from New York to San Francisco. Messrs. A. Law & Co., New York, were her owners.

Among other fast passages on the New York-San Francisco

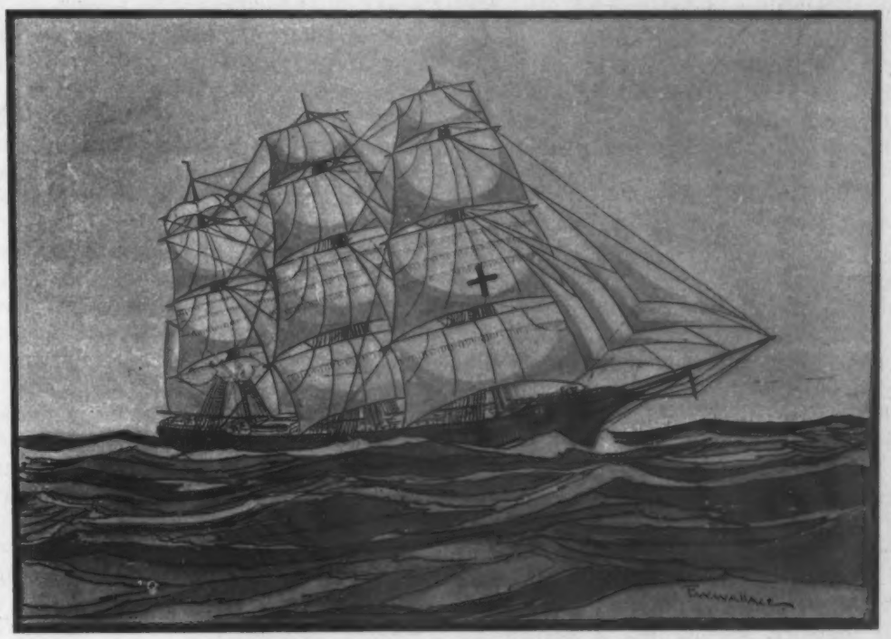


FOUR-MASTED CLIPPER BARK GREAT REPUBLIC, 1853. THE FIRST VESSEL TO USE DOUBLE TOPSAIL YARDS.

route may be mentioned the runs of the Swordfish, 90 days; Flying Fish, 92 days; John Gilpin, 93 days; Sweepstake, 94 days. From 'Frisco to Boston the clipper Northern Light made the passage in 76 days, and the Trade Wind to New York in 76 days. Passages homeward from the West Coast can always be made faster than the outward runs, and most of the fast sailing done by the clippers was in "running the easting down" between the parallels of 40 and 60 South. Here they have the strong westerly winds astern of them, and it is a poor ship that cannot sail well in these latitudes.

One of the most famous of the Yankee clippers was the Red Jacket, built by George Thomas, at Rockland, Me. On her first voyage she ran from New York to Liverpool, January, 1854, dock to dock, in 13 days 1 hour 25 minutes. Her daily runs were 103, 150, 265, 311, 217, 106, 125, 319, 413, 374, 342, 300, 374 miles. On her second voyage she ran from Liverpool to Melbourne in 69 days 11 hours. From the longitude of the Cape of Good Hope to Port Philip Heads she ran the distance in 17 days 10 hours—an "easting" run that has never been equaled.

It would be well to mention here that a great many of these "day's runs" cannot be relied upon to any great extent. Most of them were made in the turbulent, windy latitudes south of 40, and skippers, with pardonable pride in their craft, were prone to exaggerate their sailing abilities. It may have happened that the master was out in his reckoning—say astern of his actual position—and when he got a true position he found himself further ahead than he thought he was, and came to the conclusion that his ship had made a marvelous run. Again, in dead reckoning without an observation, he may rely upon his log reading and calculate run by this method.



ATLANTIC PACKET SHIP DREADNOUGHT, 1850-1860.

Another famous and infamous clipper was the Challenge. When she was launched, in 1851, she was the largest ship afloat. She was commanded by the notorious "Bully" Watterman, and carried a crew of 60, all told. Her first voyage to 'Frisco under Watterman gained for the Challenge an ugly reputation as a "hell-ship," and there is no doubt about it that Watterman sent many of the crew to their last account. He was committed for trial in San Francisco, but got off. The Challenge was also famous as the craft that flew an ensign as large as an ordinary ship's main topsail, and had a pennant from her main truck that reached to the deck.

The true clipper ship had a good beam in proportion to her length; but, though they were beamy, they were not box-like. Their bows and underbodies were moulded in easy lines and with small resistance. Their beam enabled them to carry a tremendous press of sail, and in beating to windward the American skippers forced their craft to eat into the wind by all the sail they would stand. By unceasing vigilance they made fast passages, and lived up to the motto, "What she won't carry, she'll drag."

British shipowners soon found out that they could not compete against American vessels for fast freight and passenger service, and the most up-to-date firms chartered American vessels or had them built for the Australian and Western Ocean trades. It was not until 1868, when the Aberdeen composite clipper ship Thermopylæ was built, that Great Britain could claim equality with American craft for speed.

The Thermopylæ was built by Wm. Hood & Cox, of Aberdeen, Scotland. Her dimensions were: Length, 212 feet; beam, 36 feet; depth, 20 feet. On her first voyage she left Gravesend on November 7, 1868, and let go her anchor off Port Philip, Melbourne, on January 9, 1869—a passage of 60 days, pilot to pilot, and the record. From Melbourne she made record passages to New Castle, N. S. W., from there to Shanghai, and thence to London with tea, making the last passage in 91 days—another record, beaten, a fortnight later, by the beautiful yacht-like clipper Sir Lancelot. On her second voyage to Melbourne she took 61 days, but her greatest achievement was in running 7,796 knots in 30 consecutive days—an average of 259 knots a day.

It is with a tinge of regret that we realize that those days are gone. Our ships spelt prosperity and loomed large in the world's affairs. Liverpool docks in the fifties were crammed with Yankee vessels, and the Stars and Stripes predominated. American captains were as well known to the inhabitants of the British city as our President is to-day, and the passages they made were the talk of the hour. All Liverpool crowded to the pier head to see a smart American ship sail out or come in, and the newspapers rang with the passages of the Black Ball liners, Train's Boston packets and American ships in the trans-Atlantic and Australian trades. Passengers in those days often preferred the packet ships to the steamers, and accommodations were spoken for in advance on the crack ships, the prices paid being in many cases high. In addition to the cabin passengers, many were carried in the steerage; and at first the sailing ships pushed the steamers hard as regards popularity, many of their passages equaling those of the steamers as regards time.

The euphonious names of the ships were household words, and the mere mention of Ocean Herald, Pride of the Ocean, White Squall, Tornado, Flying Cloud, Witch of the Wave, etc., would lead to an interesting discussion regarding their passages and their merits.

With the advance of steam and iron shipbuilding the white-winged clippers had to give way and seek other trades. Their memories alone remain strong in the minds of men who love splendid sailors and splendid ships.

Navigating Equipment for Motor Boats

APPARATUS REQUIRED FOR THE PROPER AND SAFE OPERATION OF SMALL CRAFT, INCLUDING THE U. S. GOVERNMENT REQUIREMENTS

By CHARLES H. HALL

THE proper navigating equipment for a motor boat depends somewhat on the size of the boat and largely on the extent of her cruising ground and the character of the waters in which she may operate. Nevertheless, there is a certain minimum outfit that should be on hand always if any cruising is to be done.

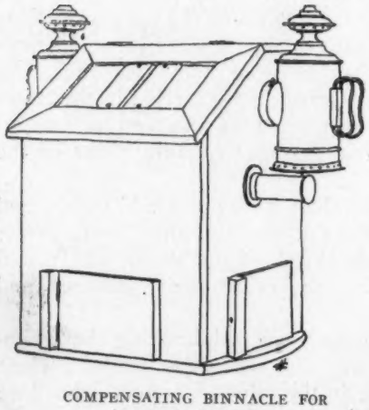
First and foremost is the compass, and a good one from a reliable dealer will prove best in the end. True, a good compass costs real money; but there is an old adage about "spoiling the ship for a ha'p'orth o' tar" that should be borne in mind. A small, single-needle dry compass is often more of a hindrance than a help, especially in a small, lively boat; while a well made liquid compass, with a large, clearly marked card, will give a feeling of security in fog that will amply repay one for the money expended. The best makes of dry compasses, with light card and many needles, equal the liquid compasses in steadiness and sensitiveness, but cost as much as the corresponding sizes of the liquid ones.

In making a long run a card as large as 6 or 7 inches diameter will allow much greater nicety of steering than a small one, as with a 7-inch card one can steer to a degree, while with a 2 or 3-inch card the boat can scarcely be kept within a half point either side of her course. The binnacle, or box containing the compass, should be of hard wood, brass or copper, without any iron or steel in its structure, and should be arranged for proper illumination at night. The majority of binnacles are lighted with oil lamps, though some have been put on the market lately with electric lamps. Care must be taken that the light is thrown on to the card and not in the helmsman's eyes, and is not too bright. At the New York Motor Boat Show a binnacle was exhibited with a tiny incandescent lamp of only 35/100 candle-power. In any case, double shutters sliding across the after part will be found useful. For day running the shutters are thrown back or the binnacle hood removed entirely; for night work the shutters are brought almost together, leaving but a narrow slit through which the lubber's line and an inch or so of the card may be seen. If the binnacle hood is removable the azimuth instrument may be used for taking bearings.

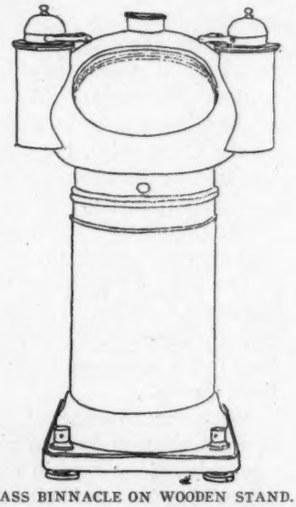
The location of the compass should be given considerable thought in planning a new boat, so that it may be close to the wheel, in a commanding position, and as far removed as possible from the disturbing influence of iron and steel. In fitting a compass on a boat already built there is little choice left, as it must be under the helmsman's eye as he stands at the wheel. The center line of the binnacle shown by the "lubber's line" must be strictly fore and aft, and should be in the center line of the boat, if practicable. Keep all steel and iron away from it, as well as the spark coil and electric wiring. Do not stow a shot-gun, marlinspike, frying pan, or other similar object close to the compass, even if a bulkhead or deck intervenes, and expect it to be unaffected. A boat davit that swings in or out within 10 feet of the card will affect its direction. Iron skylight hinges will affect it, though they may be covered up with paint, and so unsuspected. A steel shaft in the steering gear may be a hidden snare.

On a small open launch the binnacle is usually of the type known as the "boat binnacle," with fixed top, one sloping side of glass and no shutters. Such a binnacle is usually stowed in a locker when not in use, but should have chocks fitted to receive and hold it securely when needed for steering. A cabin cruiser generally has the binnacle permanently secured and of a more elaborate pattern than the boat type. A compensating binnacle with removable head will be the most convenient and useful. The fee paid to a professional adjuster for compensating its errors will purchase much peace of mind during the season and prevent worry as to whether "the deviation should be applied to the right or left." In any case, whether compensated or not, the deviation should be ascertained by any of the well-known methods of "swinging ship" and recorded in a deviation table or diagram. Indeed, the whole subject of compass error should be carefully studied, for the needle points *true* north in few spots on the earth and *magnetic* north very seldom when not properly adjusted and compensated. It should be almost superfluous to add that when the compass adjuster has finished his work the magnets and quadrantal correctors should *never* be disturbed, *even temporarily*, or the entire adjustment may be destroyed.

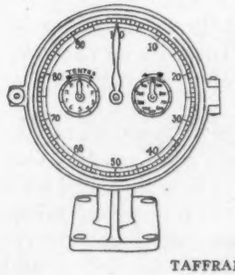
Next in importance comes the chart, or marine map, which shows the coast line and channels, sand banks, reefs, ledges, and other dangers; lighthouses, lightships, beacons, buoys, range-marks, etc., all classed as aids to navigation; and the depth of water and nature of the bottom at all points. The U. S. Govern-

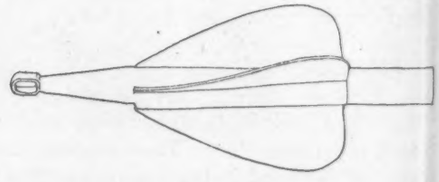


COMPENSATING BINNACLE FOR PILOT HOUSE.



BRASS BINNACLE ON WOODEN STAND.



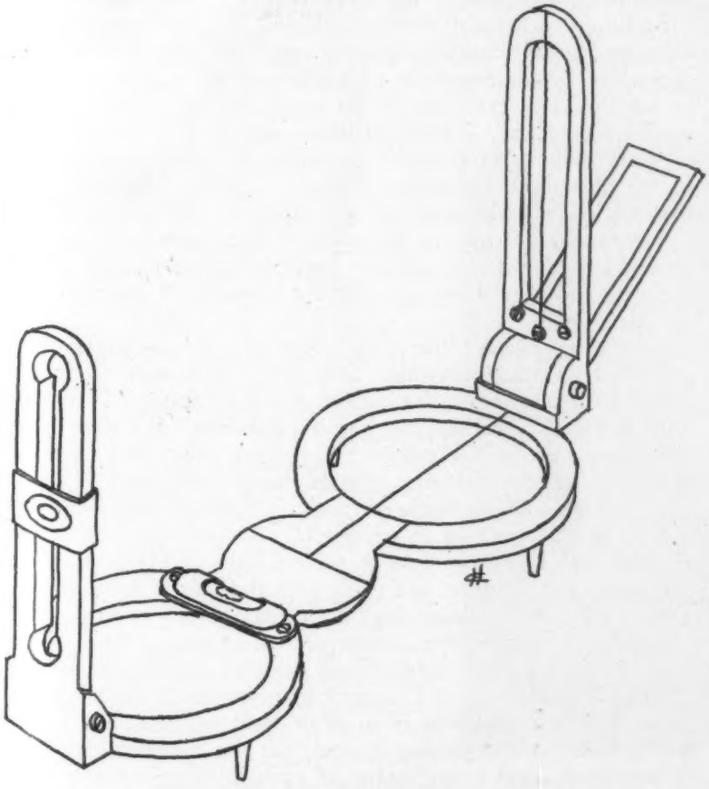


TAFFRAIL LOG, SHOWING DIAL AND ROTATOR.

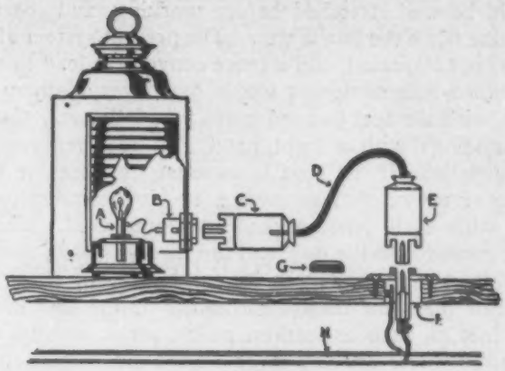
ment charts are the best and clearest, and should always be used, taking pains to get the latest issue and not trusting to one two or three years old, as channels and shoals often shift, buoys and lights are sometimes changed in location or characteristic, new ones established, lighthouses abandoned, fog signals altered, and so on. A marginal note, "Aids to navigation corrected to (date)," should always be looked for. The U. S. charts are so cheap that there is no excuse for going without them into strange waters.

The stowage of charts in an open boat is always a vexing problem, as the rolled chart is an abomination to use and the flat one takes up valuable space. The writer has seen this problem solved by cutting the charts into sections about 10" x 14", glueing a section on each side of a thin board and covering the whole with a transparent, waterproof varnish. Boards only ¼ inch thck and made of three sheets of veneer will be found useful, but should receive a coat or two of paint, especially on the edges, before mounting the charts. On a cabin boat a proper chart table should be provided, with soft pine top and several shallow drawers at least large enough to take the chart when folded once. If space is at a premium, the blank margins may be cut off and several inches gained. The chart table should be readily accessible from the helmsman's post. A chart frame with soft pine back and glass cover will be found most useful on deck, especially in wet or windy weather. The chart should be fastened to the back by thumb-tacks, and the glass cover should have a rigid frame that will swing up and be held up by a catch when plotting courses or bearings. The whole may be permanently secured near the steering wheel or arranged to drop into chocks, being stowed below when not wanted.

For plotting bearings on the chart, laying out courses, etc., a parallel ruler, 15 or 18 inches long; a good pair of dividers, 5 or 6-inch size, and a fairly soft pencil of triangular or hexagon section and an eraser will be required. The dividers and the mount-



AZIMUTH INSTRUMENT FOR TAKING BEARINGS.



ELECTRIC SIDELIGHT, SHOWING CONNECTION AND DECK PLUG.

ings of the ruler must be of brass, german silver, or similar non-corrosive metal, as steel would soon rust in the dampness of a boat. Have a little shelf for them over the chart table, or a small drawer for them and the azimuth instrument, and keep them in their proper place when not in use. Get good instruments from a reliable dealer and take care of them. Narrow bags filled with sand or fine shot will keep the edges of the charts from curling up when stowed in the drawers. Always keep the charts in the proper order, and, if folded, mark the number and name on one of the corners next the front of the drawer.

An azimuth instrument will be found invaluable for taking bearings, whether of the sun or of some terrestrial object, such as a lighthouse. This is an apparatus of bronze that slips on the glass cover of the compass bowl with a projecting lug that fits into a depression in the glass and centers the instrument. At either end a sight vane hinges up, a stop limiting its travel, one vane having an eye-piece, sliding up and down, and the other a vertical wire and a blackened mirror that may be swung up or down. A horizontal wire crosses the center of the base in line with the vanes, and a small spirit level is fitted at right angles to the line of sight. When in use the instrument is set and centered on the compass bowl, the sight vanes swung up until vertical, and the apparatus revolved until the vertical wire, when viewed through the eye-piece, bisects the distant object. Now looking at the card, the horizontal wire will be seen against a division, and the direction is easily read. When not in use the vanes are folded down and the instrument may be left on the bowl, ready for use at a moment's notice, or stowed in its box and kept at hand. It is a necessity when swinging ship for compass error or when accurate bearings are wanted, and is inexpensive. Some of the more expensive metal binnacles have revolving hoods fitted with vertical wires, but to my mind the azimuth instrument is far handier to use.

To identify lighthouses, buoys, etc., the lists published by the Lighthouse Bureau should be obtained. One of these, the "List of Lights and Fog Signals on the Atlantic and Gulf Coasts," gives full information about every lighthouse, lightship, lighted buoy and fog signal on those coasts. Another, the "List of Buoys, Beacons and Day Marks," covers all the unlighted aids to navigation. These books may be obtained *free* from your chart dealer or by writing to the Lighthouse Bureau at Washington. The various volumes of the "Coast Pilot," published by the U. S. Coast and Geodetic Survey, give much valuable data about channels, courses, dangers, tidal currents and kindred topics, and cost but fifty cents each, durably bound in canvas.

The lead and line is used for finding the depth of water at any spot. The hand lead should weigh from seven to fourteen pounds, and the line may be ten or twenty fathoms long. The

line should be well stretched before marking, and the marking must be done while the line is wet. The present system of "marks and deeps" is antiquated, and a more convenient lead line for the average motor-boat navigator would have every fathom marked up to five, with the feet marked up to two fathoms. Getting accurate soundings with a light hand lead requires considerable practice, especially if the boat is traveling 10 knots or so. For navigating rivers or shallow bays a 10-foot sounding pole may be used, with each foot marked and numbered. The marks should be carved into the pole and the numbers also, so that they may be *felt* at night. Roman numerals—I, II., etc.—are suggested. For the same reason the marks of the lead line are of different fabrics, such as leather, calico, serge and flannel. Do not forget to allow for the stage of the tide when comparing soundings with the chart.

When making an extended cruise with long daily runs through open waters, the patent log will be found a most useful device, especially if fog be prevalent. The usual form consists of a rotator, which is towed at the end of a long line and revolves as it passes through the water. This rotary motion is transferred through the line to the recording mechanism, which has dials with pointers showing the distance traveled. It should be read every hour, and also every time the course is changed or a bearing or sounding taken. It should be hauled in before entering a harbor, to avoid damaging the rotator by contact with oyster stakes, buoys, or other objects. The rotator must be taken aboard carefully and not allowed to swing against the boat's side, as a very slight bend in a blade will vitiate the readings of the log. Another form of log is now manufactured where dial shows *speed* instead of *distance*, and is actuated by the pressure of water caused by the boat's forward motion. If the engine revolutions are known and data for a "speed-revolution curve" are at hand, the distance run can be obtained by noting engine revolutions and elapsed time. Many of the Sound steamboat lines navigate thus in thick weather; but, if the draft of water varies much from that when the data were obtained, this method is hardly reliable. A well made patent log varies very little in successive runs over a course of fixed length and with the same length of line. The maker should be consulted as to the proper length of line to use, as this differs with the size and speed of the boat.

For ocean cruises sextant, chronometer, nautical almanac and tables must be added to the above list; but for the usual coastwise port-to-port run the equipment specified will be all that is required.

The U. S. Government requirements for motor boats are contained in the Pilot Rules and in Circular No. 207, issued by the Department of Commerce and Labor, which contains a copy of the act of Congress approved June 9, 1910, and certain Regulations by the acting secretary of the Department of Commerce and Labor. The current circular is dated June 9, 1910, and should be studied by everyone interested. The act defines the words "motor boat" as including "every vessel propelled by machinery and not more than 65 feet in length, except tugboats and towboats propelled by steam." Motor boats are divided into three classes by over-all length, class one including all boats less than 26 feet, class two from 26 to 40 feet, and class three from 40 to 65 feet.

The running lights to be carried "in all weathers from sunset to sunrise" are as follows: Class one, a white light aft, to show all around the horizon, and a combination lantern forward showing green to starboard and red to port through ten points of the compass each side from right ahead to two points abaft the beam, the white light to be higher than the colored lantern. These lanterns may have plain glass, but the larger boats must have fresnel or fluted lenses on and after July 1, 1911. Classes two and three must carry a twenty-point white light forward "as near the stem as practicable," showing through ten points on each side and with lenses not less than 19 and 31 square inches area, respectively. Also, a ten-point light each side, green to starboard, red to port, with lenses not less in area than 16 and 25 square inches, respectively. In addition to these, a white light aft showing all around the horizon. The side lights shall be fitted with screens, to prevent the lights showing across the bow, these screens being not less than 18 inches long for boats of class two and 24 inches long for class three. Let me remark that the screens alone do not prevent the lights from showing across the bow for a point or so; but a vertical cleat on the forward edge, equal in depth to the distance from screen to center of flame, will prevent the lights from showing across the bow, and should be fitted on all light screens.

The lights specified above are *running lights,* and the circular, under the heading "Regulations," calls attention to the requirement for an anchor light "forward, where it can best be seen, but at a height not exceeding 20 feet above the hull—a white light in a lantern, so constructed as to show a clear, uniform and unbroken light, visible all around the horizon at a distance of at least 1 mile." The provisions as to lights for pilot and fishing vessels, etc., remain unchanged, and nothing in the act is to conflict with the International Rules.

The circular goes on to require " a whistle or other mechanically-operated, sound-producing apparatus capable of producing a blast of two seconds or more in duration," which covers air whistles, electric and mechanical diaphragm horns and similar devices. Besides the whistle, boats of classes two and three must carry "an efficient fog-horn" and "an efficient bell, which shall be not less than 8 inches across the mouth on board of vessels of class three." The Regulations comment on this as follows: "The word 'efficient' must be taken in its ordinary sense, considered with reference to the object intended by the provisions in which the word appears—the production of certain signals."

Section 5 of the act prescribes "Either life-preservers, or lifebelts, or buoyant cushions, or ring buoys, or other device, to be prescribed by the Secretary of Commerce and Labor, sufficient to sustain afloat every person on board, and so placed as to be readily accessible." The Regulations state that samples of devices, as substitutes for life-preservers, etc., must be submitted to the Steamboat Inspection Service. This has created considerable criticism and discussion, into which we need not enter here, as the regulations may be amended in the issue expected this spring. Section 5 also contains requirements as to motor boats carrying passengers for hire and the licensing of operators for such boats.

Section 6 provides "that every motor boat and also every vessel propelled by machinery other than steam more than 65 feet in length shall carry ready for immediate use the means of promptly and effectually extinguishing burning gasolene," and the regulations state "no specific means * * * * are prescribed. Besides the usual fire extinguishers, suitable chemicals, or bags of coarse flour or sand, will serve the purpose. All motor boats, irrespective of length, must be so equipped." Probably your insurance company can give more light on this subject. A fire in the bilge, fed by oil and gasolene, is a mighty tough thing to fight, and the ordinary fire extinguisher does not contain nearly enough liquid to subdue it. Preventive measures, such as having the gasolene tanks in a watertight compartment draining overboard, running the pipes outside the hull from tank to motor, lining the bilge with metal under the motor to form an oil-tight pan, etc., are far superior to any extinguishing devices; yet the law, though vague, is mandatory, and such "means of extinguishing burning gasolene" must be carried.

BOAT BINNACLE WITH ELECTRIC LIGHT ATTACHMENT.

The last regulation, No. 9, is important: "Motor boats are required to have on board two pamphlets of the pilot rules to be observed by them, which will be furnished by local inspectors of steam vessels on request. Copies of this circular should be inserted therein." The pilot rules should be not only on board, but carefully studied and digested.

Dealers in marine supplies can supply the lanterns prescribed by law in the proper sizes for the different classes. Remember that a boat 26 feet long belongs in class two, and one 40 feet long in class three. Brass running lights are more expensive than galvanized ones, but are much neater in appearance when kept polished, though very slovenly-looking when allowed to tarnish.

The problem of side lights on a small open launch is a vexing one, as spray is apt to crack the lens and extinguish the light if an oil-burner. The small boat has little freeboard, and the lights are, consequently, close to the water, unless a standing top is fitted, when they can be placed on it. Electric lights are convenient, as they do away with the dirty job of cleaning and filling, and, if care is taken to have all wiring and connections waterproof, are not affected by flying spray or rain. But even if incandescent lamps are fitted, the oil founts should be kept ready in case of trouble with the electric system.

A good whistle—something that will give more than a mere squeak—is a necessity, especially if intending to navigate crowded waters. The average whistle carried on small motor boats can hardly be heard in the traffic of New York harbor, and is really a source of danger, as the pilots of other vessels may be misled by hearing no signal.

In conclusion, let me urge all motorboat pilots to study the elements of navigation, including compass deviation, plane sailing, finding position by bearings, and the effect of tides and currents. And let them not be content with a mere superficial acquaintance with the subject, but dig out and understand the underlying principles.

Seamanship, also, though an art best learned by experience afloat in all weathers, yet owes much to theoretical investigation. Study during the winter, supplemented by practice in summer, will go far to give confidence in novel situations.

STANDARD FOR HOLDING STERN LIGHT ON SMALL, OPEN BOATS.

The Month in Yachting

IT is most gratifying to be able to chronicle the fact that the lesson of unpreparedness taught the Motor Boat Club of America when the British challenger for the International Motor Boat Trophy, Pioneer, failed to take the prize back to England, simply because her engine broke down at Larchmont last summer, has been taken to heart. Nothing, we now hear, will be left undone to keep the cup from making that trans-Atlantic trip which British sportsmen most desire. Commodore Melville for the past months has assumed the rôle of a hustler, and the good results of his activity are manifest when it is announced that nine defenders are being designed to meet the best products that the British builders can send here. Of course, the fact that nine boats are "on the boards" does not necessarily mean that they will all be in the water when the proper time comes. But it is affirmed that there will be at least six contenders for the honor of racing against the foreign cracks. This is fine news, and puts us in a position to look forward confidently to the supreme test next August. The Electric Launch Company is building two of the boats. One enjoys the alluring designation—an Elco-plane; she is from designs by the Electric Launch Company, and will be fitted with two 300-horsepower engines. Some class to this! She is to be owned by A. E. Smith, owner of the Ethel May II. The other racer is a Fauber hydroplane for J. Stuart Blackton. There will be, we are happy to say, a defender designed by Clinton H. Crane, which was ordered by a syndicate consisting of Commodore Melville, Vice-Commodore F.K. Burnham and August Heckscher. With characteristic care, Mr. Crane has had the model tested in the tank at Washington. Her engines will, of course, be of extreme power, and she will be watched eagerly in the coming season. The Atkin-Wheeler Company is building a boat for Commodore Melville and Mr. Heckscher, which will, no doubt, have better fortune than the boat this company turned out last year — the Restless. T. F. Chesebrough is also having a racer built by this company. Harris Hammond is having a defender built by the Rice Gas Engine Company. She will have two 300-horsepower motors of the two-stroke, reversible type.

CARA MIA.

Each country will be represented by three boats in the international event, and, basing judgment on the performance of Pioneer last year—at the same time making justifiable allowance for improvement—it is a safe wager that, if the defenders are not equal to at least forty-two or three miles an hour, the

cup's sojourn in this country will not be likely to continue more than a few months longer. And this is going some, believe me.

There is a course for motor boating not far from New York which has always attracted me, and I have been filled with wonder that it has not been discovered by motor boatmen ere this. I refer to the Reynolds Channel at Long Beach. Here is a stream of water 1,000 feet wide and 40 feet deep which makes in from Rockaway Inlet and follows a course straight as an arrow for five miles until one reaches the Long Island Railroad and the Long Beach automobile bridges. Thence the channel continues for about five more miles, rounding into the sea whence it came at Point Lookout. Announcement has recently been made of the formation of the Long Beach Yacht and Motor Boat Club, of which Lawrence Perry is Commodore. This club will give a great deal of attention to motor boat racing, and will hold a three days' regatta on dates to be announced later. For racers of Class A a $600 cup will be offered, and there will be races for all classes from B to G, A. P. B. A. rating, for valuable trophies. An attractive feature of this week will be a race for cruising power boats from Gravesend Bay around Scotland and Sandy Hook Lightships to Long Beach, a course of about thirty miles. There will also be held, on a date to be announced later, a race for windjammers over this ocean course for a $500 trophy. Long Beach is easily accessible by boat from New York and points along the coast, and the intention of the Long Beach Club is to make of it an important center for racing.

SLOOP LUSITANIA, A TYPE DEVELOPED ON THE MAINE COAST.

I have just received a sheaf of New York Yacht Club news, about the most important being that there is a possibility that Westward will be raced, after all. It will be remembered that Captain Barr's death and the illness of the owner, Alexander S. Cochran, combined to put Westward out of next season's reckoning. Now, it appears, a movement is on foot whereby the Westward may be chartered or purchased outright by a member of the New York Yacht Club. If this comes to pass—and it is to be hoped that it will—there will be some fine racing in waters between New York and Vineyard Haven this season. If Westward does, in spite of the foregoing report, remain on the other side, Elena, Commodore Plant's new 90-footer, will have no foe worthy of her steel save Irolita, formerly Queen. On form, Elena should have easy picking against Queen; but form does not always materialize. Queen was never any slouch of a boat, and there is no reason for believing that her new name will be found to have retarded her speed. As a matter of fact, if Westward does not come out, it will mean that Elena will have to indulge in handicap and special races against inferior opponents. Isn't that a fine condition of affairs? Here is one of the really sportsmanlike yachtsmen of the country, who had the gumption to build a boat, and now he finds the prospects of anything to race against poor. Fine incentive for racing men to build boats, is it not? It would be up to the New York Yacht Club to form a syndicate, buy Westward, and race her for all she is worth. It would pay the club if several syndicates were to build and race boats. They say money can do anything; the New York Yacht Club has plenty of that, if it is short on the old-time racing spirit. Why not give it a try?

Avenger will be brought out for racing by Rear-Commodore Bacon, it is said, and there are reports that Shimna is to be sold and raced. Shimna and Avenger! How exciting!

But here is some real racing news. There is a rumor that three of the Marblehead 31-footers will come around Cape Cod this year to race for the Manhasset Bay trophy, now held by the American Yacht Club. Mavourneen, one of the New England 31-footers, came down to the Sound last year, and was one of the three yachts which contested for this trophy. Cara Mia, owned and sailed by Stuyvesant Wainwright, won, and the Gardner-designed boat Windward, which won the trophy for the Indian Harbor Yacht Club in 1909, was also a contestant. One of the three Massachusetts boats is a new craft from designs by George Owens, creator of Dorello, and, as she has been laid down with the Manhasset Cup event in view, "Stuyve" Wainwright had better look alive.

Something happened the other day which is chiefly striking to me, inasmuch as it caused emotions of wonder that the thing had not happened before. I refer to the decision to form an association of yacht clubs having quarters along the Delaware River. On almost all other bodies of water where clubs exist a bond of interest in the way of a general organization has been found to be wonderfully helpful. To go no further, the Long Island Sound Yacht Racing Association and the Yacht Racing Association of Gravesend Bay may be suggested as cases in point. The meeting to talk over plans was held in the Yachtsmen's Club, Philadelphia, and the organizations which have been invited to become charter members are: The Corinthian, the Keystone, the Philadelphia, Delaware River, Beverly, Red Dragon, Yachtsmen's and Chester City Yacht Clubs and the Camden Motor Boat Club.

We reproduce herewith a picture of Joseph M. Mann's fine old hooker Lusitania. The "Lucy" is not a racer, but she can stand up to any sea that old ocean off the coast of Maine rears, and she can carry a party of twelve all day without spreading a seam. Some people must have $12,000 racing sloops in order to get sport out of yachting, but others get just as much sport in craft that cost so much less that we hesitate to name the price. That was the kind of boat we sailed on when boys; we have been on many a gilded craft since; but us for the pot-bilged, bluff-bowed windjammer, with a mast like the Columbus monument.

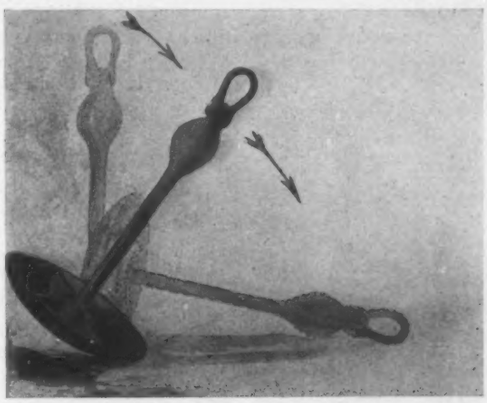
Elsewhere in this issue we print the full report of President Koerner, of the A. P. B. A., showing the remarkable growth of that organization during the year.

Mooring Equipment and Ground Tackle for Small Boats

By HERBERT L STONE

THERE is probably no other part of a boat's equipment on which the safety of the craft depends as upon her ground tackle. Unquestionably more yachts are wrecked and damaged during a season through dragging their moorings or anchors in a summer blow than in any other way. The majority of boat owners do not seem to realize the necessity for having a mooring and anchoring equipment of sufficient weight, or, if they have a good equipment, very often they do not look to it that sufficient precautions are taken in properly securing the boat against emergencies before leaving her for any period of time.

This may be due somewhat to the fact that many of the motor boats that are bought to-day, being stock boats, are naturally turned out with little or no equipment. One small anchor is the most that the average builder provides, and the average purchaser is usually content to try to get through the summer without going any deeper into his pocketbook for ground tackle. This is false economy; for the boat's safety may be many times imperilled in even ordinary summer weather, and the damage it can do to other boats may often be greatly in excess of the damage incurred itself. Not only should every boat owner, no matter how small the craft, see that he has a proper equipment, but he should learn how to handle it, as in no particular is good seamanship more apparent than in the way one comes to or weighs an anchor.



MOORING MUSHROOM WITH WEIGHTED SHANK TO INSURE ITS LYING FLAT ON THE BOTTOM.

Ground tackle may be divided, in a general way, into two classifications, (1) Moorings, by which is meant a permanent anchorage at which the yacht swings when in the home port, and (2) anchor and cable equipment. We will consider first the former of these classifications.

If a boat is not kept permanently tied to a dock, but is kept anchored off, or in the stream, as it is sometimes called, it is advisable that permanent moorings be planted, which can be cast off when getting under way and picked up when returning without the necessity of getting an anchor on deck each time. It is imperative that this permanent mooring be secure and plenty heavy enough to hold the boat in any kind of weather, especially where the craft is to be left alone for any length of time.

The weights, or anchors, at the lower end of these moorings may be of varied kinds and of widely divergent forms. In a soft bottom a flat stone of suitable size and weighing from 150 to 400 pounds, according to the size of the boat, may be used by drilling a hole through its center, through which hole an iron rod is run and fastened on the under side by a nut and washer, a ring-bolt having been previously forged in the upper end of the rod to take the cable. This flat stone will bury itself in the mud and make a secure mooring, though it is not as effective on a hard or sandy bottom. This kind of mooring is not only hard to handle, but is difficult to take up, and is not as satisfactory in many ways as the mooring anchors provided especially for the purpose. The possible saving of cost in the former is more than outweighed by the trouble in procuring and making it.

HOW A MOORING MUSHROOM TAKES HOLD.

The best form of mooring anchor is probably what is known as the mushroom anchor—a round cast-iron bowl or saucer, from the center of which runs a horizontal shank with a ring at the end in which to fasten the cable. These mushrooms work their way down into the mud or bottom, have no stock on which the chain may become foul, and, when entirely buried beneath the bottom, the pull exerted is not only lateral to the plane of the saucer, but causes it to work deeper into the bottom.

A further development of the mushroom principle has brought out a bulb-shank mushroom, which has a heavy ball of iron cast on the end of the shank just under the ring or shackle. This weight causes the anchor to lie flat on the bottom at all times, giving the maximum resistance to the strain of the boat, and prevents the shank from standing upright, which might be a source of danger to the boat's bottom if moored in shallow water. Also, in responding to the jerk of a boat in a seaway when fetching up suddenly on her cable, this bulb will rise slightly from the bottom, thus easing the strain to a great degree.

These mushrooms are set at an angle to the shank to give the best degree of bite under strain, and have a sharp edge, which will take hold in a hard, sandy bottom.

To the ring or shackle in the end of the shank should be fastened a chain cable of ample size, and in length depending upon the amount of room a boat has in which to swing. In a crowded anchorage 50 to 60 feet is all the scope that one boat can be allowed, though more is preferable when it can be had. On the other end of the chain is a shackle with a thimble, around which should be spliced a 6 to 12-foot length of heavy manila cable at least an inch and a half in diameter for boats up to 40 feet long, and from two to two and a half inches for larger sized vessels. This is to take aboard the boat and belay over bitts or capstan. The size of the chain necessary will vary with the size of the boat; but for boats under 30 feet, ⅜-inch diameter will be large enough, ½ inch for boats under 40 feet, and ¾-inch for boats under 60 feet. To prevent this mooring line from sinking when cast off, it must be buoyed to a float which may be reached at all times, no matter what the state of the tide. Various types of floats may be used, from a wooden block 18 inches long by 3 inches square to an elaborate can buoy or an 8-foot cedar post with a ring in the end. If a small buoy is used, a light hand line should be spliced through the middle of the hemp

VARIOUS FORMS OF MOORING BUOYS.

mooring line (or through the eye splice in the upper end of the mooring line, if finished in this way) and the other end made fast to the buoy. This line may vary in length according to the rise and fall of the tide and the depth of water. It must be long enough to reach the bottom at high water, to prevent the weight of the chain from pulling the buoy under. If a long mooring buoy is used sufficiently large to float the weight of the chain, the chain may be fastened to it by a ring-bolt and shackle or by an iron strap on the under end of the buoy.

In regard to the size of these mushroom anchors, it is difficult to make a hard-and-fast rule as to what weight any particular sized boat would require, the character of the bottom and the exposed position of the anchorage being determining factors. Roughly, it may be said that, for a boat under 25 feet in length, a from 75 to 125-pound mushroom would be sufficient in a sheltered anchorage and good holding ground; for a boat from 25 to 30 feet, from 125 to 200 pounds; from 30 to 40 feet, 230 to 300 pounds, and from 40 to 60 feet in good anchorage, a mooring of from 400 to 500 pounds should be sufficient, though, as I said before, a hard bottom or an exposed anchorage would take larger sizes. It is poor economy to risk a vessel worth anywhere from $1,000 to $10,000 by reason of saving a few pounds in the weight of the mooring.

The anchor equipment is no less important than the mooring equipment, and should receive the greatest consideration from the yacht owner, and particularly from the man who is his own captain. There are so many kinds and types of anchors on the market to-day, each possessing its good points, that it is hard to say what type is best, though it is an easy matter to tell what constitutes an efficient equipment for a given type of boat.

FOLDING ANCHOR FOR YACHTS AND POWER BOATS. HANDY AND CAN BE STOWED IN SMALL SPACE.

For those who may not know the names of the various parts of an anchor, I would state that the shank is the central shaft, from the lower end of which project two curved arms, on the points of each being a broad triangular or half round blade called the fluke, pointed at the outer end. Through a hole in the upper part of the shank passes the stock, at right angles to the shank. This stock may be made of wood or iron, and was formerly rigidly attached to the shank, though to-day in yacht anchors the stock usually has a knob on either end, while one end is curved, the entire stock sliding through a hole in the shank, so that it can be folded back parallel to the shank when not in use. It is kept in position when in use by means of a welded collar and a pin, or forelock, as it is called. In the extreme upper end of the shank is worked a forged iron ring, or else a large open shackle is fastened to it by the pin working through a hole.

In addition to this common form of anchor, a handy and convenient anchor, and one that is coming into more general use on account of the fact that it may be stowed in a small space, is the folding anchor, in which both arms fold up against the shank when not in use, while both ends of the stock fold down against the shank, each being held in place in either the open or the closed position by a pin (see illustration). These anchors are principally useful on motor boats, where it is not desirable to carry an anchor on deck, as they may be stowed below in a locker or under a cockpit seat, where they may be quickly reached and are yet out of the way.

Then there is the stockless anchor, particularly useful on boats with hawse pipes, as the shank pulls up into the pipe, leaving only the flat flukes protruding. This does away entirely with having to get the anchor on deck at any time.

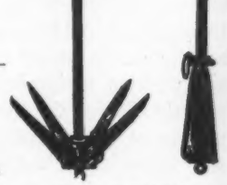
Then there is the grapnel, a small anchor with four or five arms or flukes radiating from a common shank, useful mostly for small boats or as light anchors for fishing or when anchoring for only a short time.

The principal qualifications of any anchor are its ability to bite quickly, hold firmly, and yet be easily broken out and weighed. With the coming into use of the small motor and sailboat, it is also desirable to have one that will stow compactly when not in use. This is particularly necessary in power boats, as in sailboats the anchor is generally "catted" on its bowsprit, where it is always ready to use and yet is out of the way. In power boats they either have to be lashed on a flat deck, where they are often unsightly and in the way, or else stowed below.

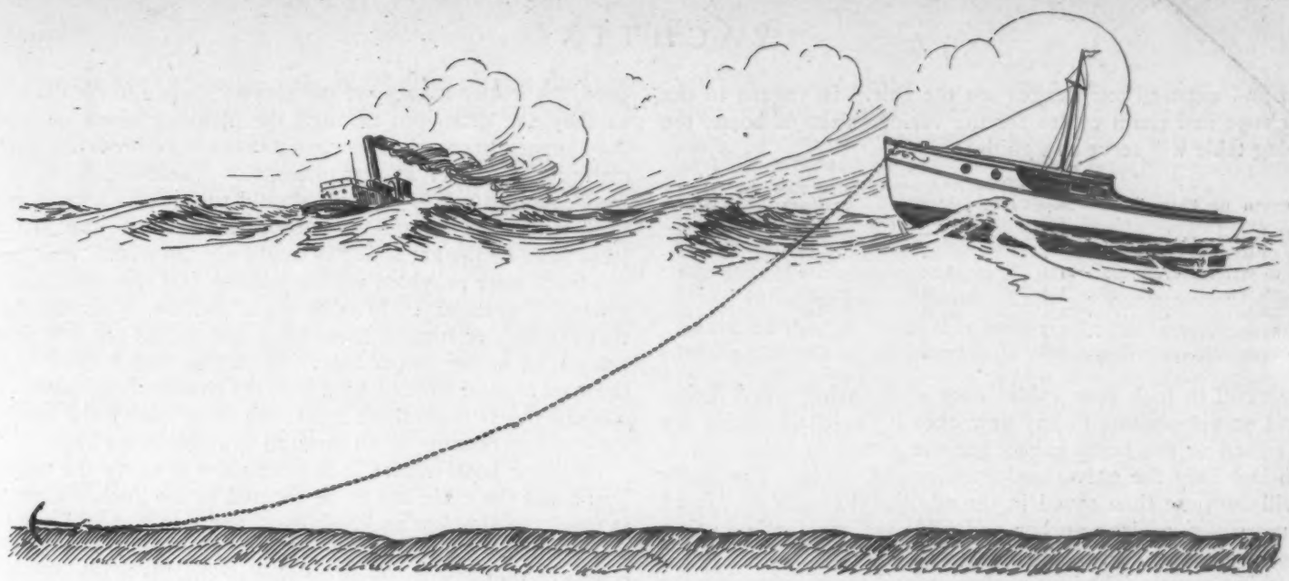
Every boat should carry at least two anchors, and, if possible, three, varying in size for different uses. Where two are carried, one should be of medium weight, for holding the boat in ordinary weather and in sheltered harbors, and not too heavy to handle easily, while the other should be a storm anchor, considerably heavier, and large enough to hold the boat under nearly any conditions she is likely to meet. If a third anchor is carried, it may be a light one, for use as either a kedge anchor or for fishing or anchoring for a short time only. There should be a separate cable for each of these anchors, the cable for the heavier anchor being larger than that for the light one.

As between a hemp and chain cable there is much to be said on both sides. A hemp cable is easier to handle, has more give

TYPE OF STOCKLESS ANCHOR.



FOLDING GRAPNEL.



RIDING TO THE BIGHT ON A CHAIN CABLE

to it, and does not weigh as much, while a chain cable may be stowed in less space, is stronger, and with a lot of scope, so that the vessel will "ride to the bight," as it is called, the weight of the chain eases the strain and jerk on the cable. The reason for this is that, as the pull on the chain increases, the curve of the cable is straightened out, lifting more of it off of the bottom and forming a long bight, to which the vessel rides with little strain. If, however, not enough scope has been given her, a chain cable makes hard riding, owing to the jerk with which a vessel is brought up short when she rises to a sea, there being no give to the chain.

I was on a sailing vessel once bound to the West Indies, when we anchored in the lower bay, on account of a S.E. gale. When the wind let up we could not get our anchor for over a day, owing to the fact that the captain was afraid, when he hove her short, that she would snap her cable when she rose on the heavy southeast sea that was rolling in. On the fishing banks, where they ride to a long scope, the fishermen still use a manila cable, on account of the spring there is in the line. Another drawback to a manila cable is that, when anchoring regularly on a rough or rocky bottom, the lower end of the cable is apt to chafe or fray on the rocks. In an open launch I would advise a hemp cable for both anchors, while for a cabin boat, if two anchors are carried, it is best to have the lighter one attached to a manila cable, while the heavier one, if it weighs over 60 or 75 pounds, should have a chain cable attached. These cables should be at least 100 feet long, and 150 feet is better if there is room to stow it.

The length of cable used each time will, of course, vary according to the depth of water, and the length paid out, or scope, should be from four to five times the depth. It may sometimes be even less than four times when making a short stop, and, in case of bad weather, much more should be given her. Giving her more scope will often bring up a vessel that is dragging with what seems to be an ample length of cable. For this reason it is always best to have a cable long enough to allow a fairly good scope to be kept in reserve. A chain cable may always be stowed behind a short bulkhead in the eyes of the boat, while a hemp cable must be coiled down either below or on deck. Never stow a hemp cable below while it is wet. Leave it on deck until thoroughly dry, even if it has to stay there several days, as it will rot much quicker if stowed in a hot cabin while wet.

A FISHERMEN'S BEND FOR MAKING CABLE FAST TO ANCHOR

The inboard end, usually called the "bitter end," of a cable, should be securely fastened, so that, in paying out the last bit of scope, or in fetching up on the anchor, if it is ever necessary to let go in a hurry to stop the headway of the ship, it will not go overboard. Be sure to see that this is done and that the cable, whether hemp or chain, is always clear. On chain cables it is also well to have a swivel in the chain between the anchor and the chocks or hawse pipe to take care of any kinking in the chain due to the swinging of the vessel around the anchor in the shifting tides or winds, though this is not necessary on sizes less than 3/8 inch in diameter.

If it is ever necessary to let go a second anchor, it should, of course, always be done from the opposite bow from which the first anchor is. And it will also be necessary to pay out more scope on the first cable in order to drop the boat astern of the second anchor and allow some of the second cable to run out, fetching the boat up on it to allow it to "bite." Of course, if the boat is dragging on the first anchor, all that will be necessary is to pay out a fair scope on the second cable and then hold it until the weight of the boat has fetched up on the second anchor and caused it to take hold, when the cable may be made fast.

As to the size of cables and anchors necessary to fit the various boats, one cannot, of course, state an invariable rule, as local conditions and the cruising ground to be covered play a very important part in the matter. For general cruising a rule that will suit average conditions is to allow about a pound and a half for over-all foot of length for the lighter anchor for daily use, and from two pounds to two pounds and a quarter per running foot for the heavier anchor. This method of figuring will be found to be on the safe side, except where hard

bottom and exposed anchorages are the rule. In regard to the size of rope and chain cables for the various sizes of boats, the following table will serve as a guide:

Length of Boat.	Diameter. Rope Cable.	Diameter. Cable Chain.	Anchors. Ordinary.	Anchors. Heavy.
Under 30 ft.	⅜	—	40	60
30 ft. to 40 ft.	1	¼	60	80
40 ft. to 50 ft.	1¼	5/16	70	100
50 ft. to 60 ft.	1⅜	⅜	90	120
60 ft. to 70 ft.	1½	⅜	100	140
70 ft. to 80 ft.	1⅝	½	120	160
80 ft. to 90 ft.	1¾	⅝	135	180

Be careful to look your cables over each spring when fitting out, and do not hesitate to buy new ones if the chain cables are badly rusted or the hemp cables become rotted or worn. It is best to buy only the galvanized anchors and chain. The extra cost will be more than saved in the additional length of life of both; moreover, an iron anchor and cable are constantly rusting and discoloring the sides of the boat, or the bilge inside.

One thing more. The best anchoring and mooring equipment in the world will not avail unless there are good bitts to which to belay them. It has become, unfortunately, quite a common thing for power boats to be turned out with nothing but heavy cleats screwed into the deck on which to make the cable fast; and, indeed, the owner is lucky if the screws happen to hit deck beams, as they are often put through the planking alone or wherever they happen to come. Strong bitts should be provided, and especially in boats over 25 feet in length. These should be of hardwood, such as oak or ash, and should run down through the deck flush with the after side of some deck beam into the foot of the stem piece or the keelson. It would also be wise if bitts or Samson posts were provided aft for making fast the stern line or for towing, if necessary. In ordering a boat the owner should insist that the builder furnish these bitts, and should see to it that they are put in in the proper way. In sailing yachts there is always the mast around which a turn with the cable may be taken; but on modern power boats there is no such thing handy, the signal mast very seldom running down through to a step in the keel.

In motor boats where it is customary to carry the anchor inboard and the cable has to be secured to the anchor each time it is used, the simplest and best knot, and one that will not jam or work, is what is known as the "fisherman's bend," consisting of a couple of round turns about the ring or shackle in the anchor, with the end brought over the standing part and tucked under both turns, as a glance at the drawing will show. The end may then be either seized or secured with a half hitch. If it is a chain cable, it is secured by shackle and pin.

Navigation for the Amateur

A SHORT COURSE IN THE SIMPLER METHODS OF FINDING POSITION AT SEA BY OBSERVATION OF THE SUN'S ALTITUDE—THE USE OF SEXTANT AND CHRONOMETER

By CAPT. EDMUND MORTON

PART II—TIME SIGHTS FOR LONGITUDE

THE method of finding the longitude is merely to find the exact time at one's position and the exact time at Greenwich at the same instant, and to turn the difference of time into degrees and minutes of longitude. For this purpose a chronometer is needed regulated to Greenwich mean time, with its error and daily rate of gaining or losing. When a chronometer is taken from a nautical store a slip of paper is given with it, upon which is stated its error on a given date and its daily rate of gaining or losing, as the case may be. The error can then be reckoned for each day and set down in the Nautical Almanac for a month in advance, if desired, ready for daily use.

The time by chronometer is Greenwich Mean Time, while the time found by observation of the sun is Apparent Time. The difference metween mean time and apparent time is called the Equation of Time, which is given for each day of the year in the Nautical Almanac.

An apparent solar day is the interval of time between two successive transits of the sun over the same meridian. As such intervals of time make the days of slightly unequal length, a fictitious time has been invented, called mean solar time, which makes all the days of the year of equal length. This is done for the purpose of regulating clocks and chronometers to a uniform rate instead of changing the time each noon as the sun crosses the meridian. Four times during a year mean time and apparent time are the same. At other times the mean time is either before or behind apparent time, the greatest difference amounting to over 16 minutes. This difference is called the Equation of Time, before mentioned, and the apparent time may be changed to mean time, or the Greenwich mean time may be changed to apparent time by applying the Equation of Time as indicated in the Nautical Almanac. Both times must be of mean time or both of apparent time before their difference is taken to get the longitude.

Both the Equation of Time and the declination of the sun are given in the Almanac for Greenwich noon. As these quantities are changing daily, the hourly differences are given in an adjoining column, and they must be corrected to time of observation, according as that time is before or after Greenwich noon. The correction must be added or subtracted as the quantity is shown to be *increasing* or *decreasing* daily.

As the sun appears to make one revolution around the earth in a day (that is, 360 degrees in 24 hours), apparently it moves to the westward 15 degrees each hour. At a place 15° west of Greenwich the sun will rise one hour later than at Greenwich, and at a place 15° east of Greenwich the sun will rise one hour earlier than at Greenwich, and so on. In comparing the time between two meridians the time at the most easterly meridian will be the greatest or latest. At 12 o'clock Greenwich noon it will be only 7 a. m. in Longitude 75° West, just five hours earlier. The problem, therefore, is to find the correct local time at a given instant and apply it to the Greenwich time taken from the chronometer at the same instant.

We have seen that a meridian altitude is the best for latitude; but for longitude observations of the sun taken about 8 a. m. or 4 p. m. are the best, as the altitude is then changing rapidly, and, consequently, the time can be determined more accurately. Whenever practicable, the morning or afternoon sights should be taken when the sun is on or near the prime vertical—that is, when it is bearing due east or due west—as then even a large error

in the latitude used will make only slight difference in the longitude obtained. An altitude of at least 20° is preferred, to prevent great errors by refraction.

To find the longitude, take an altitude of the sun with the sextant at the most favorable time in the forenoon or afternoon, and at the instant the sun's lower limb is brought in contact with the horizon note the exact time by chronometer. Correct the chronometer time for its error (if slow, add; if fast, subtract the error), which will give the correct Greenwich mean time. Correct the altitude observed for instrumental error, semi-diameter, refraction and dip of the horizon. This will give the sun's true central altitude, as explained in the last article.

Then find the latitude by account at time of observation. The latitude is usually found at noon by a meridian altitude of the sun. If the time sight is taken in the morning the latitude is brought back from noon; or if in the afternoon, it is carried forward to time of observation by applying the difference of latitude made during the interval. To do this take the time, compass course and distance sailed in the interval from noon to time of sight and inspect Table No. 1, Bowditch. The course will be found at either the top or bottom of the page. And then find the distance in the column so marked above or below where the course is found. Three columns are found here, marked distance, latitude and departure, the departure being the distance in nautical miles made east or west. If the course is found at the top of the page, the difference of latitude must be taken from column marked latitude at the top. If course is found at bottom of the page it must be taken from column marked latitude at bottom of page. To the latitude found at noon add or subtract the difference of latitude found in this table, which will give the approximate latitude at time of sight.

Take the sun's declination and the Equation of Time and correct them to time of sight. They are given in the Nautical Almanac for Greenwich mean noon. The hourly differences are given in adjoining columns. Multiply these hourly differences by the number of hours it is before or after Greenwich noon and divide the sum by 60 (seconds), which will give the correction to be applied, according as it is before noon or after noon at Greenwich; also, as the quantity is increasing or decreasing daily.

Next find the polar distance, as explained in the last article. If the latitude and declination are both north or both south, subtract the declination from 90° for the polar distance; but if one is north and the other south, their sum will be the polar distance.

Now, add together the sun's true central altitude, the latitude at time of observation and the polar distance and divide their sum by 2. From this half-sum subtract the altitude, which gives the remainder. Take from Table No. 44 the log. secant of the latitude, the log. cosecant of the polar distance, the log. cosine of the half-sum and the log. sine of the remainder. Take half the sum of these logarithms and inspect the column of sines in Table No. 44, where the hour-angle, or apparent time, will be found in an adjoining column, either a. m. or p. m., as the case may be. If there is a difference between the logarithm sought and the one found in the column of sines, enter the table at the bottom of the page with the difference, which will give the proportional parts for seconds.

To this apparent time just found is added or subtracted the corrected Equation of Time, as directed in the Nautical Almanac, to convert it into mean time at ship. Now apply this time to the corrected Greenwich mean time. If the Greenwich time is the greatest, subtract the time at ship from it and convert the difference of time into degrees and minutes of longitude (Table No. 7), which will be named West. If the time at ship is greater than the Greenwich time, the ship will be in East Longitude.

Here is an example of a longitude sight. On June 18, 1910, about 8:30 a. m., an altitude of the sun was observed and the time noted by the chronometer. Chronometer slow 3 minutes 51 seconds. Ship was approximately in Latitude 34° 00′ N. Longitude 73° 30′ West. Height of the eye 10 feet.

Obs. alt.	44°	24′	
Corr.	+	12′	
Corrected or true central alt.	44°	36′	
Lat.	34°	00′	secant
Polar dist.	66°	36′	cosecant
	2) 145°	12′	
Half sum	72°	36′	cosine
True alt.	44°	36′	
Remainder	28°	00′	sine

Logs. taken from Table No. 44.

Log secant lat.	.08143
Log cosecant P. D.	.03727
Log cosine H. S.	9.47573
Log sine remainder	9.67161
	2)19.26604
Log sine of app. time	9.63302

Find apparent time in Table No. 44, column of sines.

Apparent time	8h. 36m. 29s.,	A. M.
Equa. time N. A.	+ 42s.	
Mean time at ship	8h. 37m. 11s.,	A. M.

Green. mean time	1h. 27m. 01s.
Slow	3m. 51s.
Cor. G. M. T.	1h. 30m. 52s., P. M.
M. T. at ship	8h. 37m. 11s., A. M.
Long. in time	4h. 53m. 41s.

Converted into degrees and minutes, Table No. 7:
73° 25′ West.

Here is an example of an afternoon sight for longitude, taken about 5 p. m., August 12, 1910:

JUNE. At Greenwich Mean Noon. **1910.**

Day of the Week.	Day of the Month.	THE SUN'S Right Ascension	Semi-Diameter.	Declination.	Diff. for 1 hour.	Equation of Time. ADD to Mean Time. Sub. from M. Time. SUBTRACT from App. Time. Add to App. Time	Diff. for 1 Hour.
		h. m. s.	′ ″	N. ° ′ ″	″	m. s.	s.
Wed.	1	4 33 50	15 48	^ 21 58 30	20	^ 2 31	0.365
Thur.	2	4 37 56	15 47	22 6 42	20	2 22	0.382
Fri.	3	4 42 1	15 47	22 14 32	19	2 12	0.399
Sat.	4	4 46 8	15 47	22 21 58	18	2 2	0.415
SUN.	5	4 50 15	15 47	22 29 1	17	1 52	0.430
Mon	6	4 54 22	15 47	22 35 41	16	1 42	0.445
Tues.	7	4 58 29	15 47	22 41 56	15	1 31	0.458
Wed.	8	5 2 37	15 47	22 47 48	14	1 20	0.470
Thur.	9	5 6 45	15 47	22 53 16	13	1 8	0.481
Fri.	10	5 10 53	15 46	22 58 19	12	0 57	0.491
Sat.	11	5 15 1	15 46	23 2 58	11	0 45	0.500
SUN.	12	5 19 10	15 46	23 7 13	10	0 33	0.508
Mon.	13	5 23 19	15 46	23 11 4	9	0 20	0.515
Tues.	14	5 27 28	15 46	23 14 30	8	v 0 8	0.521
Wed.	15	5 31 37	15 46	23 17 31	7	^ 0 4	0.526
Thur.	16	5 35 46	15 46	23 20 7	6	0 16	0.531
Fri.	17	5 39 56	15 46	23 22 19	4	0 29	0.534
Sat.	18	5 44 5	15 46	23 24 6	3	0 42	0.537
SUN.	19	5 48 15	15 46	23 25 28	2	0 55	0.538
Mon.	20	5 52 24	15 46	23 26 26	1	1 8	0.539
Tues.	21	5 56 34	15 46	23 26 59	0	1 21	0.539
Wed.	22	6 0 43	15 46	v 23 27 7	0	1 34	0.538
Thur.	23	6 4 52	15 45	^ 23 26 50	1	1 47	0.536
Fri.	24	6 9 2	15 45	23 26 8	2	2 0	0.533
Sat.	25	6 13 11	15 45	23 25 2	3	2 12	0.529
SUN.	26	6 17 20	15 45	23 23 31	4	2 25	0.525
Mon.	27	6 21 30	15 45	23 21 35	5	2 38	0.520
Tues.	28	6 25 39	15 45	23 19 15	6	2 50	0.515
Wed.	29	6 29 47	15 45	23 16 30	7	3 2	0.508
Thur.	30	6 33 56	15 45	v 23 13 21	8	v 3 14	0.500

Declination Increasing / Decreasing. Equation Decreasing / Increasing.

Page from Nautical Almanac for June, 1910, showing Declination, Equation of Time and Difference for Each Hour.

Obs. alt.	21°	13′
Correction	+	10′
Cor. alt.	21°	23′
Lat. by D. R.	31°	50′ secant
Polar distance	74°	57′ cosecant
	2)128°	10′
Half sum	64°	05′ cosine
True alt.	21°	23′
Remainder	42°	42′ sine

Logs. from Table No. 44.

Log secant lat.	.07079
Log cosecant P. D.	.01516
Log cosine H. S.	9.64054
Log sine remainder	9.88133
	2)19.55782
Log sine of app. time	9.77891

From Table No. 44.

Apparent time	4h. 55m. 34s., P. M.
Equa. of time (from N. A.)	+ 4m. 57s.
Mean time at ship..	5h. 00m. 31s., P. M.
Green. mean time..	9h. 49m. 25s.,
Chron. slow	6m. 08s.
Cor. Green. M. T...	9h. 55m. 33s., P. M.
Mean time at ship..	5h. 00m. 31s., P. M.
Long. in time	4h. 55m. 02s.

Converted into degrees and minutes, Table No. 7:
73° 45′ 30″ West.

Sight for Longitude taken about 8:30 a. m., February 2, 1911:

Obs. alt.	28°	42′
Correction	+	10′
Cor. alt.	28°	52′
Lat. by acc't	28°	57′ secant
Polar dist....	90°	
Sun's d'l, S. 17° 02′	107°	02′ cosecant
	2)154°	51′
Half sum	77°	25′ cosine
Cor. alt.	28°	52′
Remainder	53°	33′ sine

Logs from Table No. 44.

Secant lat.	.03910
Cosecant P. D.	.01948
Cosine H. S.	9.33818
Sine remainder	9.90546
	2)19.30222
Sine of app. time	9.65111

From Table No. 44:

App. time at ship...	8h. 27m. 10s.
Equation of time.. +	13m. 48s.
Mean time at ship..	8h. 40m. 58s., A.M.
Green. M. time	1h. 28m. 09s.
Chron. slow	10m. 29s.
Cor. Green. M. T...	1h. 38m. 38s., P. M.
Mean time at ship..	8h. 40m. 58s., A. M.
	4h. 57m. 40s. W.

Converted into degrees and minutes of longitude by Table No. 7:
74° 25′ West.

It may be well to explain further the use of Table No. 44. In the first example for longitude we require the secant of the latitude, which is 34° 00′. On page 642 we find 34° at the top left-hand corner. In the column marked "secant" we find the logarithms 10.08143. The 10 may be discarded, the decimal number alone being used. We next seek the cosecant of the polar distance, 66° 36′, which is found on page 631. In the lower right-hand corner we find 66°, and, following up the column of minutes on the same side, we come to 36′, taking from the column of cosecants adjoining the logarithm 10.03727, discarding the 10 as before. Next find the cosine of the half-sum 72° 36′, on page 625, in the same way. This is found to be 9.47573, keeping the whole number. The sine of the remainder, 28° 00′, is found on page 636 to be 9.67161, retaining the whole number. We next take one-half of their sum, 9.63302, which is the sine of the apparent time, and, entering the column of sines, we look for this number, which is found on page 633. The nearest logarithm here found is 9.63292, which is a difference of 10, to be entered in the small table for proportional parts at the bottom of the page on the line marked A. This gives us 3 seconds of time. The sine 9.63292 gives us 8 hrs. 36 min. 32 sec., taken from the column marked A. M. at the top of the page. From this time subtract the 3 seconds found from the difference of the logarithms, which gives us 8 hrs. 36 min. 29 sec. a. m., the local apparent time at ship.

Observations taken at sunrise or sunset are used for longitude, although large errors are liable to occur through refraction or imperfect horizon. To determine the longitude by this method, watch the sun's lower limb with a marine glass at either rising or setting, and at the instant it touches the horizon note the time by chronometer. Add together the latitude by account and the polar distance. From their sum subtract 21′ and divide the remainder by 2, which gives the half-sum. Then add 21′ (a constant used to allow for semi-diameter and refraction) to the half-sum, which gives the remainder. The Logarithms are now taken from Table 44 the same as in an ordinary time sight, and the apparent time at ship found, to which the Equation of Time is applied, converting it into mean time. Then the difference between mean time at ship and the Greenwich mean time will be the ship's longitude in time, which must be converted into degrees and minutes. When the sun's upper limb is observed, use 53′ instead of 21′ in the same way.

TABLE 44.

Log. Sines, Tangents, and Secants.

S′. 25°	Hour A. M.	Hour P. M.	A Sine	Diff.	A Cosecant.	B Tangent.	Diff.	B Cotangent	C Secant	Diff.	C Cosine.	G′. 154° M.
0	8 40 0	3 20 0	9. 62595	0	10. 37405	9. 66867	0	10. 33133	10. 04272	0	9. 95728	60
1	39 52	20 8	62622	0	37378	66900	1	33100	04278	0	95722	59
2	39 44	20 16	62649	1	37351	66933	1	33067	04284	0	95716	58
3	39 36	20 24	62676	1	37324	66966	2	33034	04290	0	95710	57
4	39 28	20 32	62703	2	37297	66999	2	33001	04296	0	95704	56
5	8 39 20	3 20 40	9. 62730	2	10. 37270	9. 67032	3	10. 32968	10 04302	1	9. 95698	55
6	39 12	20 48	62757	3	37243	67065	3	32935	04308	1	95692	54
7	39 4	20 56	62784	3	37216	67098	4	32902	04314	1	95686	53
8	38 56	21 4	62811	4	37189	67131	4	32869	04320	1	95680	52
9	38 48	21 12	62838	4	37162	67163	5	32837	04326	1	95674	51
10	8 38 40	3 21 20	9. 62865	4	10. 37135	9. 67196	5	10. 32804	10. 04332	1	9. 95668	50
11	38 32	21 28	62892	5	37108	67229	6	32771	04337	1	95663	49
12	38 24	21 36	62918	5	37082	67262	7	32738	04343	1	95657	48
13	38 16	21 44	62945	6	37055	67295	7	32705	04349	1	95651	47
14	38 8	21 52	62972	6	37028	67327	8	32673	04355	1	95645	46
15	8 38 0	3 22 0	9. 62999	7	10. 37001	9. 67360	8	10. 32640	10. 04361	2	9. 95639	45
16	37 52	22 8	63026	7	36974	67393	9	32607	04367	2	95633	44
17	37 44	22 16	63052	8	36948	67426	9	32574	04373	2	95627	43
18	37 36	22 24	63079	8	36921	67458	10	32542	04379	2	95621	42
19	37 28	22 32	63106	8	36894	67491	10	32509	04385	2	95615	41
20	8 37 20	3 22 40	9. 63133	9	10. 36867	9. 67524	11	10. 32476	10. 04391	2	9. 95609	40
21	37 12	22 48	63159	9	36841	67556	11	32444	04397	2	95603	39
22	37 4	22 56	63186	10	36814	67589	12	32411	04403	2	95597	38
23	36 56	23 4	63213	10	36787	67622	12	32378	04409	2	95591	37
24	36 48	23 12	63239	11	36761	67654	13	32346	04415	2	95585	36
25	8 36 40	3 23 20	9. 63266	11	10. 36734	9. 67687	14	10. 32313	10 04421	3	9. 95579	35
26	36 32	23 28	63292	11	36708	67719	14	32281	04427	3	95573	34
27	36 24	23 36	63319	12	36681	67752	15	32248	04433	3	95567	33
28	36 16	23 44	63345	12	36655	67785	15	32215	04439	3	95561	32
29	36 8	23 52	63372	13	36628	67817	16	32183	04445	3	95555	31
30	8 36 0	3 24 0	9. 63398	13	10. 36602	9. 67850	16	10. 32150	10. 04451	3	9. 95549	30
31	35 52	24 8	63425	14	36575	67882	17	32118	04457	3	95543	29
32	35 44	24 16	63451	14	36549	67915	17	32085	04463	3	95537	28
33	35 36	24 24	63478	15	36522	67947	18	32053	04469	3	95531	27
34	35 28	24 32	63504	15	36496	67980	18	32020	04475	3	95525	26
35	8 35 20	3 24 40	9. 63531	15	10. 36469	9. 68012	19	10. 31988	10. 04481	4	9. 95519	25
36	35 12	24 48	63557	16	36443	68044	20	31956	04487	4	95513	24
37	35 4	24 56	63583	16	36417	68077	20	31923	04493	4	95507	23
38	34 56	25 4	63610	17	36390	68109	21	31891	04500	4	95500	22
39	34 48	25 12	63636	17	36364	68142	21	31858	04506	4	95494	21
40	8 34 40	3 25 20	9. 63662	18	10. 36338	9. 68174	22	10. 31826	10. 04512	4	9. 95488	20
41	34 32	25 28	63689	18	36311	68206	22	31794	04518	4	95482	19
42	34 24	25 36	63715	19	36285	68239	23	31761	04524	4	95476	18
43	34 16	25 44	63741	19	36259	68271	23	31729	04530	4	95470	17
44	34 8	25 52	63767	19	36233	68303	24	31697	04536	4	95464	16
45	8 34 0	3 26 0	9. 63794	20	10. 36206	9. 68336	24	10. 31664	10. 04542	5	9. 95458	15
46	33 52	26 8	63820	20	36180	68368	25	31632	04548	5	95452	14
47	33 44	26 16	63846	21	36154	68400	25	31600	04554	5	95446	13
48	33 36	26 24	63872	21	36128	68432	26	31568	04560	5	95440	12
49	33 28	26 32	63898	22	36102	68465	27	31535	04566	5	95434	11
50	8 33 20	3 26 40	9. 63924	22	10. 36076	9. 68497	27	10. 31503	10. 04573	5	9. 95427	10
51	33 12	26 48	63950	23	36050	68529	28	31471	04579	5	95421	9
52	33 4	26 56	63976	23	36024	68561	28	31439	04585	5	95415	8
53	32 56	27 4	64002	23	35998	68593	29	31407	04591	5	95409	7
54	32 48	27 12	64028	24	35972	68626	29	31374	04597	5	95403	6
55	8 32 40	3 27 20	9. 64054	24	10. 35946	9. 68658	30	10. 31342	10. 04603	6	9. 95397	5
56	32 32	27 28	64080	25	35920	68690	30	31310	04609	6	95391	4
57	32 24	27 36	64106	25	35894	68722	31	31278	04616	6	95384	3
58	32 16	27 44	64132	26	35868	68754	31	31246	04622	6	95378	2
59	32 8	27 52	64158	26	35842	68786	32	31214	04628	6	95372	1
60	32 0	28 0	64184	26	35816	68818	33	31182	04634	6	95366	0
M. 115°	Hour P. M.	Hour A. M.	Cosine.	Diff.	A Secant.	B Cotangent.	Diff.	B Tangent	C Cosecant.	Diff.	C Sine.	M. 64°

Seconds of time.	1ˢ	2ˢ	3ˢ	4ˢ	5ˢ	6ˢ	7ˢ
Prop. parts of cols. A	3	7	10	13	17	20	23
Prop. parts of cols. B	4	8	12	16	20	24	28
Prop. parts of cols. C	1	2	2	3	4	5	5

Page from Table 44, of Log. Sines, Tangents and Secants. Proportional parts of the sines are found in the small table at the bottom.

Here is an example of a sunrise sight taken January 2, 1911:

Alt.	0
Lat. by acc't.	25° 30′ N.
Polar distance	118° 00′
	188° 30′
Constant	21′
	2)138° 09′
Half sum	69° 04′
Constant	21′
Remainder	69° 25′

Log sec. lat.	.04451
Log cosecant P. D.	.03597
Log cosine H. S.	9.55801
Log sine remainder	9.97135
	2)19.60484
	9.80242

From Table No. 44:

App. time	6h. 44m. 57s.
Eq. time	+ 3m. 48s.
M. T. ship.	6h. 48m. 45s.
Greenwich M. T...	11h. 36m. 30s.
Slow	10m. 15s.
Cor. Green. M. T.	11h. 46m. 45s., A. M.
Mean time ship....	6h. 48m. 45s., A. M.
Long. in time	4h. 58m. 00s.

Table 7 changed into longitude:
74° 30′ West

(To be continued.)

Ignition Systems and Lighting Equipment for the Motor Boat

By WILBUR H. YOUNG

WHILE it is simple enough to describe the various ignition equipments, there seems to be some difference of opinion as to what is always the most desirable to use in certain specified cases, and I am free to confess that what I may consider just fills the bill in a certain case may not always meet the views expressed by some other writers on this subject.

That engine users are to-day selecting their engines and the auxiliary equipment with much greater care than in the past is demonstrated by the experience of every engine salesman in dealing with his customers. The buyer consults with his friends who are engine users, and gets their advice as to the kind, and particularly the make, of engine to buy, and then enters into a discussion with everyone he can buttonhole as to the style of ignition apparatus best adapted to his use, the said button-holing not being a very difficult matter, as nearly every owner is willing to discourse at length as to the relative merits of his particular equipment. If the buyer has an open boat and expects to be out in all kinds of weather, he is immediately advised to get a make-and-break ignition system, particularly if he lives on or near the seacoast, where the fishing industry is always carried on, fishermen being generally rather skeptical regarding jump-spark outfits. On the other hand, if he lives near a large city, where almost any style of equipment may be secured, he is more apt to become acquainted with a greater number of successful installations of the jump-spark system.

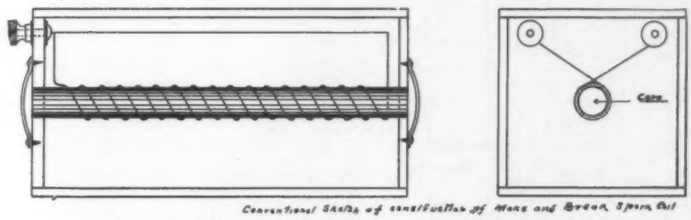


Fig. 1.—Sketch showing construction of conventional make-and-break spark coil.

It is not the purpose of this article to exploit any particular type of ignition system, but to give a general description of the various methods and suggest the ones most applicable for specific purposes to the intending purchaser who has not previously had the opportunity to go into the matter, except in a casual manner.

In the first place, it will be well, perhaps, to describe what happens inside the cylinder when it is filled with gasolene vapor under compression at the moment an electric spark is produced therein. While we call it an explosion (and will in this article), it is not really one in the strict sense of the word, but a quick burning of the charge that has been taken into the engine.

In the earlier internal-combustion engines the exploding of the charge was caused by a hot tube or ball which was first heated by a torch, and the subsequent explosions kept this tube sufficiently hot to ignite the following charges. With this method no adjustment was possible in the timing of the explosion; but with the advent of the electric spark method of ignition all engines were equipped with a timer, which permitted the charge to be ignited at any desired point of the revolution.

When the piston has reached the top of its travel the charge is under its maximum compression, and, if the charge is not ignited, as the piston travels downward this compression is reduced proportionately. In order to prevent the engine from turning in a reverse direction, the spark is timed in starting at some point after the piston has begun its downward travel, and, as an increase of speed is desired, the timer is advanced until the spark occurs before the piston reaches the top of the stroke. When the spark is made it ignites the vapor immediately surrounding the spark, which ignited vapor in turn spreads the fire to the rest of the charge, all of which is done so quickly as to produce an almost, but not quite, instantaneous ignition of the entire charge. That this is not absolutely instantaneous may be readily proved by trying a set of batteries that has been nearly run down, and setting the timer at a determined point when running, and counting the revolutions per minute, then substituting a fresh set of cells, and, with the timer at the same point of advance, the carburetor adjustment remaining the same, again count the revolutions. A decided increase of speed will be observed. This is due to the fact that the hotter spark burns a much greater amount of vapor at the initial part of the burning, and, consequently, more quickly ignites the remainder of the charge. This also shows the reason for an engine increasing its speed with the advance of the timer; for, with the timer well advanced and the spark occurring before the piston has reached the top of its stroke, the whole charge becomes ignited by the time the piston has reached the top, thus giving the maximum pressure when the piston is ready for the downward stroke. Too much of an advance is detrimental and will cause the engine to slow down.

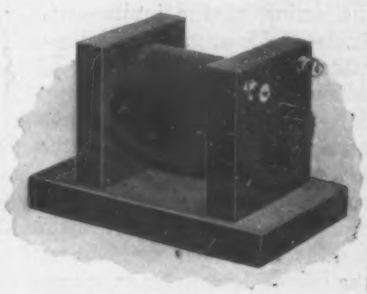


Fig. 2.—Make-and-break spark coil.

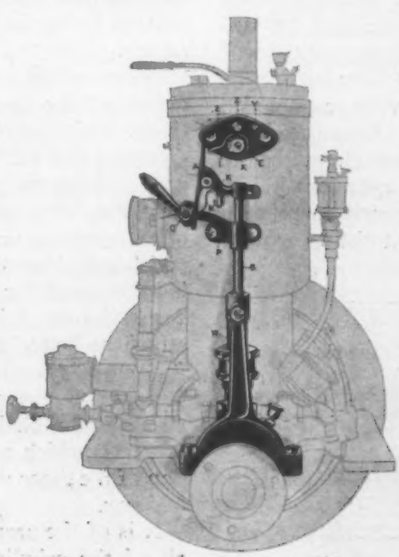


Fig. 3.—Detail of make-and-break mechanism on engine.

Now for a description of the various types of apparatus. We will first consider the make-and-break method. This is so named on account of the fact that the spark is produced by the current from the source of supply being allowed to flow through the circuit on the closing or "making" of the same and then "breaking" the circuit inside of the cylinder of the engine.

When an electric current is passed through a coil of wire and is suddenly interrupted a spark is produced of an intensity proportional

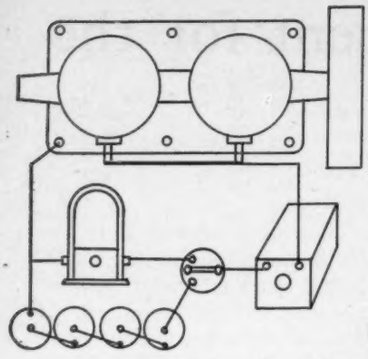


Fig. 5.—Make-and-break wiring diagram.

to the number of turns or coils of wire and the strength of the current. Should these coils of wire be wound over a bundle of soft iron wires, termed a core, the intensity of the spark is much increased. Fig. 1 shows the conventional method used in making this coil. Only one turn of wire is shown; but in practice many layers are wound over the core, each layer being well insulated from its neighbor. Fig. 2 shows a completed coil as used in practice. Fig. 3 is an illustration of a make-and-break ignition equipment which has proved very satisfactory in actual operation. The igniter trip, A, is attached to the brass connection, K, and is operated by the eccentric rod, B. This rod is guided by the bracket, P, which also supports the ignition lever, H. The lever is used by the operator to regulate the time of ignition. The sparking points, or electrodes, inside of the cylinder are brought together by the action of the igniter-trip, A, on the jaw, 2. The jaw is attached to the rocker arm, X, which passes through the plate, M. When the trip, A, throws off from the jaw, 2, the latter is forced downward by the spring, E, and striking jaw, 1, separates the sparking points inside the cylinder and causes the spark which ignites the gas. By having the sparking points attached to the plate, M, both can be instantly taken out for cleaning by removing two bolts which attach the plate, M, to the cylinder. Fig. 5 shows the method of connecting up the batteries and coil to the engine.

As to the advantages of the make-and-break spark, it is, of course, absolutely impervious to water or moisture, and, on single-cylinder engines, is probably as satisfactory as any type of ignition. It also has the advantage of extreme simplicity in its electrical connections, and on account of the low voltage employed no especial provision is necessary for insulation. As to the shortcomings of the make-and-break system, it uses considerably more current than the jump spark, and on multiple cylinders it is a difficult matter to keep each cylinder timed properly in relation to the timing of the rest of the cylinders. A slight pitting or wear of one igniter point means the changing of the timing to a considerable degree, and the points in each cylinder do not wear evenly, causing a consequent disarrangement of the entire timing of all of the cylinders, and, while this wear is readily taken up, it is necessary to make frequent examinations and adjustments to obtain the best results.

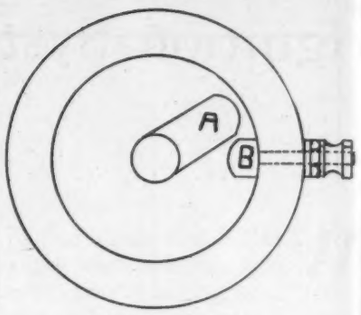


Fig. 6.—Form of timer.

The jump spark is, as its name implies, a spark that jumps across a break in the circuit, which break is located inside of the cylinder. This system is much simpler mechanically than the make-and-break, requiring only one moving part in the ordinary type, but electrically is carried in some cases to extreme complication, which has added to whatever unpopularity it has for motor-boat use. When applied to a motor car, which may be run to a garage where repairs and adjustments can be readily made, it is not an absolute necessity for the operator to be thoroughly familiar with the electrical details; but on a boat that may be out of sight of land, with the wind shrieking through the rigging or whipping the end of the ensign to pieces, it becomes very necessary to know how to make repairs in case of a breakdown.

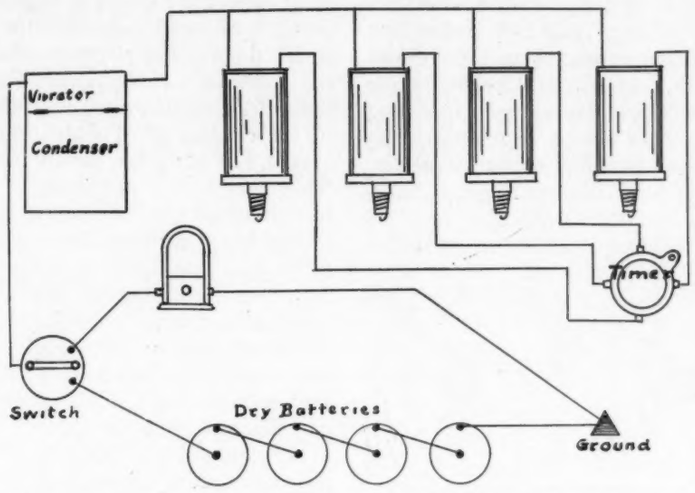


Fig. 9.—Wiring diagram of combined jump-spark coil and plug, to battery, magneto and timer.

The simplest type of jump-spark system requires a timer, a spark coil and spark plug for each cylinder, a length of highly insulated wire to connect each coil to its corresponding plug, a source of current supply (such as dry cells, storage battery, dynamo or magneto, or a combination of some of these), enough primary wire to connect up the batteries and coils, and a switch.

Timer.—One of the most important pieces of the ignition apparatus is the timer, which performs the function of directing the current to the proper coil at the proper moment. Fig. 6 shows an excellent form of timer, which consists of a revolving knife blade contact, A, which completes the circuit for each cylinder through the fixed contact, B. This form of contact is the same as used on all of the better grade of knife switches for electrical distribution, its special feature being the wiping and cleaning effect of the blade passing between the contacts, which assures the positive action of the timer with a minimum amount of wear.

It is of the utmost importance to have all of the cylinders timed so that they each receive the impulses at the same

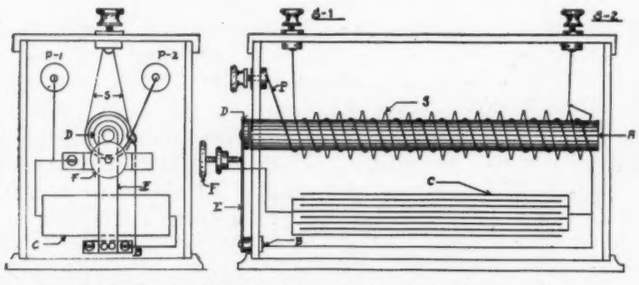


Fig. 7.—Conventional sketch of jump-spark coil, showing core (A), condenser (C), armature (D), vibrator spring (E), contact screw (F), primary winding (P), and secondary wiring (S).

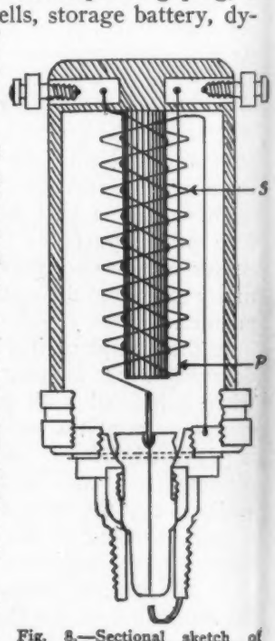


Fig. 8.—Sectional sketch of combined jump-spark coil and plug.

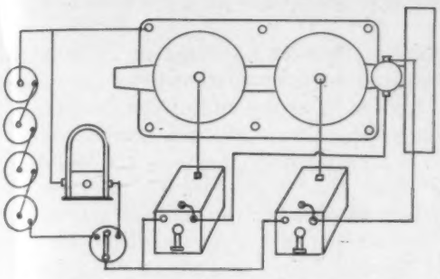


Fig. 11.—Diagram of wiring for jump-spark system.

relative point of the revolution, in order to gain the maximum efficiency of both the gasolene consumption and current consumption.

This form of timer secures this effect, and the wearing of the parts would cause no change in the timing.

Spark Coil and Condenser.—The jump spark coil (shown in Fig. 7) consists of a primary winding over a soft iron core similar to the make-and-break coil, except that a smaller number of turns of wire are used.

One terminal of the primary wire, P, is led to a binding post, P-1 (Fig. 7); the other end is fastened to the vibrator at B. Let us follow the primary current on its course: From the battery it runs to the terminal, P-1, thence to the platinum-tipped screw, F, through the vibrator to the primary wire at B, then through the primary wire to P-2, thence to and through the timer to ground on engine and back to the battery.

Over the primary wire are wound many turns of fine wire, S, each turn being highly insulated and the ends connected at S-1 and S-2. These turns constitute the secondary wiring. When the current is passed through the primary circuit it sets up a secondary current in the fine wire. This is much strengthened by the core, A, becoming magnetized. As soon as the core is magnetized it exerts a pull on the iron armature, D, of the vibrator, causing it to move away from the platinum-pointed contact screw, F, thus breaking the primary circuit, which break induces another secondary reaction in the opposite direction. This secondary current of high potential is carried by the high tension wire to the spark plug, where it jumps across the gap, producing a hot, quick spark, igniting the charge in the cylinder.

Waterproof dry battery holder which obviates the necessity of wire connections between cells.

Where multiple cylinders are used, the vibrators on the spark coils should be all of the same weight and adjusted to the same number of vibrations per second to get the best results. This is assuming that the coils are of equal efficiency, or very nearly so. It is a difficult matter to keep all of the vibrators in equal adjustment where two or more coils are used. This has led to the use of a single vibrating coil, so connected that the primary current is set up in the vibrator in one coil and led, by means of the timer, to the proper spark coils, thus making only one adjustment necessary.

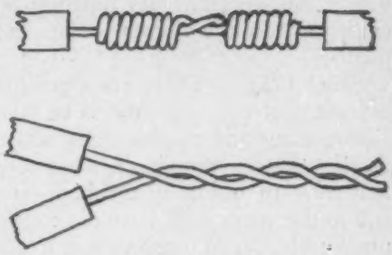


Fig. 13.—Method of making splices or joints in wire connections.

This leads us to an examination of a very excellent device that has been brought to a high stage of development in the past three years. This is a combined plug and coil for each cylinder connected to a single vibrator. Fig. 8 shows a sectional view of this device; this is a conventional drawing only. In practice the secondary windings are divided into small coils, which are slipped over the core and primary wiring. This method is termed "pan-cake" form of winding. By this means the difference in voltage between any two layers of wire is reduced to a minimum, thus reducing a chance of a breakdown of the secondary winding.

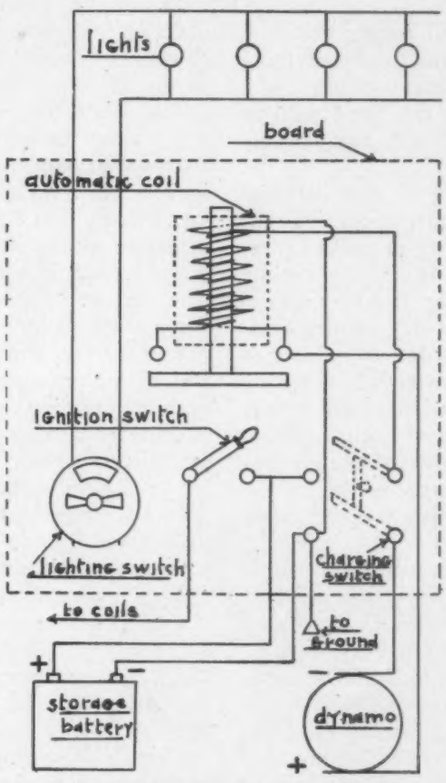


Fig. 14.—Method of connecting switches, dynamo and storage battery.

As will be noticed from an examination of Fig. 9, the wiring is extremely simple, and is confined entirely to the low-tension primary circuit. The coil is enclosed in a strong heat-and-waterproof casing, and the only high-tension wiring is contained within the coil itself. Anyone who has experienced trouble with the high-tension wire becoming wet when in use on an open launch can appreciate this advantage. This also eliminates all leakage of the current, and, consequently, constitutes a very reliable system. I used an ignition system of this type on an open speed launch in which the spray covered the engine and plugs and had not the slightest sign of a "skip" or a "miss" in an entire season, using in that time one set of five dry cells.

The vibrator, as shown in the sketch, has a small coil of wire, with sufficient ampere turns to move the armature, which latter is of light construction, to permit of a high number of vibrations per second, making this system applicable to the high-speed, multiple-cylindered engine, as well as to the single-cylindered, slow-speed engine. The primary and secondary circuits are so wound that only a small voltage is necessary, four dry cells being sufficient to operate the system. As direct current is used, a dynamo of low voltage and a storage battery may be used with this system in connection with electric lighting, if desired.

Condenser.—The condenser (C, Fig. 7) consists of a number of sheets of tinfoil, each insulated from the other, every alternate one being connected together, the two terminals being connected across the spark

Fig. 15.—Electric light fixture and block.

gap at the vibrator. Its function is to prevent the arcing of the current across the vibrator points and consequent pitting of these points.

Spark Plugs.—There are a great many successful plugs on the market, and the only care to be taken is to purchase one that is simply made and of few parts, and those heavy enough to stand putting a good pressure on when screwing into the cylinder.

Wire.—In installing the high-tension wire running from the coil to the spark coils have the coils placed as near the plugs as is practicable, for in damp or wet weather it is well not to have any more of the secondary circuit exposed to the dampness than can be helped. The very best grade of wire is none too good, and care should be taken to avoid contact with the engine frame or parts of the boat. While in daylight it might not be seen, at night a series of grounds can be noticed wherever the insulation of the wire touches anything, if it is the least bit damp.

Batteries—Dry Cells.—Dry cells are so well known that it is hardly worth while to take up the reader's time to say anything about them except that it pays to buy those manufactured by a reliable concern. It is also a good scheme to test these with an ammeter when purchasing. A dry cell should test twenty amperes.

It is just as important, however, to take care of your batteries after you install them in the boat as it is to secure good, live cells when purchasing. Thrown loosely into a locker or packed carelessly in an open box, the best dry cell will deteriorate rapidly through the effects of moisture. There is to-day, however, no excuse for such careless storage, as the wireless dry battery holders, which may be procured in sizes to hold any desired number of cells, are absolutely waterproof, so that should one's boat spring a leak and the wireless battery box be totally submerged for days at a time no injury would thereby occur to the dry cells. Moreover, these wireless and waterproof battery holders absolutely prevent any chance of short circuiting or incorrectly wiring up the cells, or the jarring loose of connections, which is a frequent cause of engine troubles.

Storage Batteries.—The lead storage battery consists of a set of plates called the positive group and a set called the negative group, immersed in sulphuric acid and separated from each other by either wooden or hard rubber separators in what is known as the pasted plate type of cells, used extensively for ignition work.

The positive plates are made of lead sheets filled with holes, termed grids, into which is forced under heavy pressure a paste made of red lead, sulphuric acid and glycerine. The negative plates are made in the same manner, except that litharge is used in place of red lead. When the cell is fully charged and ready for service the paste in the positive plates is changed by chemical action into peroxide of lead and that in the negative plates into spongy lead. Some manufacturers use a slightly different formula for making the paste; but the result is practically the same, as far as the action of the battery is concerned.

The storage battery does not store electricity, as is popularly supposed, but acts exactly the same as a dry cell or wet battery, in that the current is produced by a chemical change in the cell; only, in the storage battery, when the chemical change is completed and the battery is discharged the outside surface of the peroxide of lead in the positive plates and the lead in the negative plates are each reduced to lead sulphate, and this lead sulphate can be nearly all reduced to peroxide and spongy lead by recharging, thus bringing the battery to its former state and ready for another discharge.

Care should be taken not to allow the storage battery to stand for any great length of time in a discharged condition, as the sulphate will continue to form, and, as sulphate of lead is an insulator, would prevent the current from properly reducing it to its original condition when next charged, with a consequent loss of capacity.

Each cell of a storage battery delivers a voltage of about 2.08 at the beginning of discharge at the normal eight-hour rate, and this voltage reduces to 1.80 volts at the end of the discharge. Consequently, for a 6-volt system three cells are needed. The ampere rate of discharge is controlled by the area and number of the positive plates, the usual capacity for ignition work being 40 to 60 ampere-hours, which means that the cell will deliver 1 ampere for 40 hours in the smaller size and 1 ampere for 60 hours in the larger. For lighting lamps in addition to ignition work with the same set of storage batteries, 80 to 100 ampere-hour capacity is required for a small number of lamps. These cells are usually combined in a convenient case made of hard rubber with a sealed cover, which is provided with a vent and filling hole.

Water free from impurities should occasionally be added, to make up for evaporation, which takes place slowly, and, if allowed to continue, would lower the acid level so much that the capacity of the cell would be lowered and the parts of the plates thus exposed would become oxidized by contact with the atmosphere, which would be detrimental to their future usefulness.

Dynamos and Magnetos.—The dynamo used for lighting and ignition purposes is one that furnishes a direct current of low voltage, usually 6 to 8 volts, or multiples thereof, and consists of an armature wound with wire and rotating in a magnetic field, produced by soft iron field poles wound with wire, called field coils. The current is produced by the wire on the armature passing through the path of the magnetic field. This current is an alternating current, and is led by the wires to the commutator, at the end of the armature, which rectifies or changes the alternating current into direct current. From this commutator the current is collected by a set of brushes, from which it is led to the switch and thence to the coils, where it is transformed to an alternating current of high voltage.

In the magneto the fields are composed of horseshoe-shaped magnetized iron or steel poles, and in the direct-current magneto a commutator is also used, and the voltages are low.

The high-tension magneto has no commutator, and the armature is wound with a great many turns of fine wire and run at high speed, giving a high-voltage alternating current, which is led direct to the proper spark plug through a distributor without the use of a coil. The fact that it is a difficult matter to keep all of the vibrators in equal adjustment has led to the development of the high-tension magneto with a distributor. The magneto generates an alternating current of high tension or voltage. This current is led by the distributor to each cylinder in the proper order. This distributor, then, performs the same functions as the ordinary timer, except that its current-carrying parts are highly insulated, to take care of the greatly increased voltage.

Connections.—Figs. 5, 9 and 11 show the methods used in connecting up the various systems described. All connections should be made tight and no joints used in the wire. If a joint is made, it should be tinned and soldered and well wrapped with rubber tape and an outside layer of cloth tape wound over and the whole coated with shellac. Fig. 13 shows method of making splices or joints in the wire.

Electric Lighting.—Electric lighting for small cruisers requires a simpler and much less expensive outfit than is generally supposed by those who are inexperienced with this kind of equipment. It is not necessary to go into great detail as to the advantage, convenience and safety of this method of lighting. While the oil lamp has not seen its last day, the one feature which makes the electric light deservedly more popular as each season rolls around is *safety*. Who has not had his engine give a sudden

(Continued on page 362.)

A Winter Cruise in California

By CHARLES ROYCE BARNEY

PART II

THE MATE LEAVES US.

AT six o'clock the next morning we are tailing up-stream, and there is some breeze; so, as every moment is precious, sails are set and, close-hauled on the wind, we are making good time, and soon sight the taller buildings of Rio Vista ahead. The wind is northerly, fresh and cutting; but that dry snap pervades the atmosphere that has made us all feel so well from the start, in spite of the extreme cold, and, although there is frost on everything that I touch, as I munch a hot biscuit and follow it with a swallow of good coffee, I would not be anywhere else if I could. As we open up the long, straight reach opposite Three-Mile Slough we hold close to the north bank, for a very bad bar makes out on the opposite side. From here to town, at regular intervals, are scattered little house-boats and arks, occupied by a miscellaneous population. Drawn up in cuts and sheltered by levee and tules, they are snugly housed. Some are fishermen, others boatmen; most of them have no regular occupation. The river gives them food and drink, as well as fuel; neither does she charge them any rent. Such money as they can earn at odd jobs or by selling a few fish keeps them in clothes as they actually need. Socially (for the river has its social strata as well defined as elsewhere) they are, for the most part, of the lowest order. Still, as I often look at them, their complexions healthy and brown, the eyes of even the old and withered bright and alert, my mind cannot help but revert to another picture—to the dark, evil-smelling tenements of the city, and the life therein; while here the river, with its constant murmur and song, the fields beyond the levees, the green and blue and variegated colors of Nature, fill even the simplest with the joy of living.

THE CREW.

A few hitches back and forth across the stream as it bends a little further to the northward and we pass the wharves at the foot of Main Street and make for a flat spot under the lee of the trees that line the levee a quarter of a mile below the town. The bell of St. Gertrude's Convent is ringing as the hook takes hold in about three fathoms, close enough to the bank to jump ashore, and a long file of girls, accompanied by two Sisters of Mercy, are seen making their way to school. They are the picture of life and health, and are nothing loath to wave back to our salutations when the Sisters' backs are turned. Four of us took the launch and ran up to town. The village—for it is nothing more—is located for the most part on the hard ground that slopes away to the Montezuma hills, and is the only congregation of buildings large enough to be called by that name in the township, whose boundaries, fifty miles in circumference, enclose some of the most fruitful land in the State. The original town lay some two miles to the eastward of the present village, and, for five years following its foundation, in 1857, was exceedingly prosperous, the principal industry being canning of salmon, which were then running heavily in the river. It was located on the low ground, however, and did not have the protecting levees that look down upon the fields to-day. In the winter of the flood in California—1861-62—it succumbed, the hungry waters, backed up by a southeast gale, completely demolishing every vestige of habitation.

Our shopping done, we returned to the boat, and as the anchor left the water the convent bell was again ringing for noon, playing an accompaniment to eight bells that chimed from the cabin. The tide was now slightly against us, and for a mile we had to sail close-hauled. At 12:30 we had opened up the mouth of Old River, which turns off to the southward and is joined at this place by Cache Creek. As we eased off sheets and ran up with a free wind, I went into the cross-trees to make out the country which lay ahead. From this lofty position one overlooks mile upon mile of fertile reclaimed land, protected by high levees, between which the river and its tributaries twist and turn, the steamboats and other craft sailing upon them looking as if they were navigating on dry land, so well hidden is the water by the high dykes on either side. By two o'clock we found it necessary to tie up to the bank, as the wind had died altogether and the river was running six miles an hour. It was all that the Bull Dog, lashed alongside, could do to make headway against it, and then she just crawled; so we tied up fore and aft with a breast line, to hold her out from the bank as protection against the wash of passing steamers, and all hands went for a short walk along the levee.

To the newcomer into this fruitful region the inside of one of the reclaimed islands is a novel sight. Mile after mile of rich black soil stretches away, at this time of the year green with the sprouting shoots of young asparagus and other vegetables. A small army of working men, mostly Japanese or Chinamen, busily turn the soil or otherwise attend to the duties of the farm. Sleek, well-fed horses and cattle graze in some of the enclosures, or at the racks near the farm buildings, and, if one watches closely, or scans the level surface with a pair of high-powered glasses, an occasional flutter of wings and a line of white or gray denotes the presence of a flock of wild geese that are taking their toll of the grain fields. So destructive are these feathered visitors that on the large islands one or two men are, as a rule, constantly kept

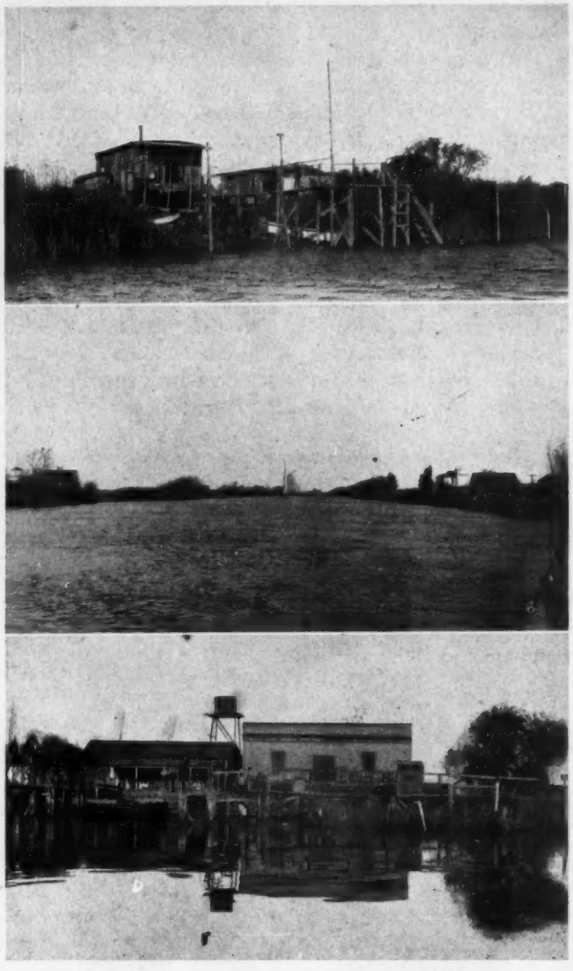
on the move patrolling. It was getting late, and the sun's slanting rays were failing to compensate for the approaching chill of a winter's night when we returned to the Iola, and the cook began to busy himself in the galley, while somebody mixed a "dry one" to precede this last dinner we are to have from our much abused cook; for he and P—— were to leave that night by the river boat, their business requiring them in San Francisco.

Some hours later I take them over to Isleton, something over a mile above us on the opposite bank, where they are to wait for the arrival of the boat in the comfortable bar-room of the hotel. Meanwhile, I strolled through the Oriental quarter of this little village, a mere handful of buildings in all, crouching down as if for protection behind the levee. It is the largest part of the town, so far as I can see, and consists of but one straight, narrow street, lined on either side with Chinese and Japanese shops, ill lighted except for that illumination which comes through the windows on either side. It is teeming with life, however, and there is a constant intermingling of the Chinese and Japanese tongue, as well as the owners of these tongues themselves. So indelible is this impression of the Far East here in this narrow street, shut in by the pitch-dark night, that it is hard to believe that I will find my launch by the levee and not a Chinese sampan. I do, however, and am soon back on board the Iola, from which we exchange farewells with our two departing friends, as the river steamer presently wheezes by, looking, with her many lights, like a floating hotel.

Next morning we were up and under way just as the gray light was turning into white. Frost was over everything. A light northwesterly breeze gave us a fair wind, which enabled us to beat the current. We needed all of the early morning that we could steal, as, with the advance of day, every little puddle and trickle, which now lay sealed in ice, would add its mite to the drainage off the vast watershed on either side, increasing the force of the current against us.

At 7:45 a. m. we had Isleton abeam, where a farmer, heavily clad and with woolen mittens on his hands, was leading two draft horses aboard the rope ferry. The rope ferry upon which they were being transported was a clever contrivance, although quite simple, and one in which the current of the river does all the work. The boat itself is no more than a large flat-bottom barge, to which is attached amidships a stout cable of varying length, according to the width of the river (in this case a little over a quarter of a mile), and supported at regular intervals by pontoons, to keep it out of the water, while its other end is attached to the bank. A simple contrivance throws the end of the boat which happens to be inshore downstream, and the pressure of the current on that end will then force it across to the other bank. The return trip is made by reversing the proceeding and hauling the other end slightly downstream, the boat swinging from bank to bank, much like the weight on a clock pendulum.

The wind increased in velocity with the advancing day, so that when we reached that bend of the river that runs north, some two miles below Ryde, there was enough to a little more than enable us to beat the current. Our course was directly in the teeth of it, however, and a 50-foot boat is slow in stays, so that, to help matters, one of us got into the Bull Dog, which, with its nose against our stern, boosted us, keeping our head up to windward and preventing us from falling back as we came about on either bank, so close that the mizzen boom brushed the willows. It was slow work, however — slow and wearing on the nerves—so that, tucked away in my yachting memories in the years to come, will be that four-hour beat, making two miles to windward over that reach below wind-swept Ryde.



WHERE FOOD AND RENT ARE FREE.

A REACH OF THE SACRAMENTO RIVER BELOW RYDE.

A RIVER HABITATION.

With Ryde abeam the wind was fair to Walnut Grove, but so narrow is the river that the steamer backs water and hugs the northern bank to let us by on our last tack across. Encounters of this kind are of frequent occurrence, and the river steamer is accommodating enough, passing you a line or pulling you clear when one of their swells has set you aground. The most dreaded floating obstacle on the narrow turns of the river are the grain barges bound down. It is not an unusual sight to see three of them, each over 100 feet long, heavily laden, one behind the other, in tow of a river steamer. They have the absolute right of way over everything, and, with a strong current running and the additional complication of a high wind, are the most unmanageable tows imaginable, as they cannot be backed, and to give them steerage way the towboat has to keep moving. They are so heavy that collision means a crushing of the sides of the average yacht like an egg-shell. I recall well one dark night having such a meeting on a narrow turn of the river. We had seen the two white lights, one above the other, of the towboat, and were on the alert, but could not distinguish the nature of the tow until it was within a hundred yards of us. I was on a small sloop, and the captain was a man of quick perception as well as experience. He never hesitated, but ran her bow high and dry in the tules just as the tail end of the last barge grazed the main boom. The next day, with the aid of a five and a half-inch line and its own swell, we were pulled off by a river steamer. To this day I never sight the two vertical lights without a vivid recollection of that barge, the water lapping under her bows and her red and green side lights gleaming like the angry eyes of some prehistoric monster bent on our destruction.

With the beam wind we are racing through the water, the

white buildings of Walnut Grove only a mile or so away, the Bull Dog, sitting on its hind quarters, being dragged along at the end of the rigid painter, its bow in the air, until one can see half its keel. A flat spot in the lee of the left bank offers a good anchorage just abreast of the town and the mouth of Georgiana Slough, and I round up to take off headway before dropping hook, only to discover that we are abreast a steamboat landing and fairly in their way should they come in. The river is narrow and the crew is forward, my hands are full with the wheel, main sheet and driver sheet to attend to, and, before I can swing off, she is caught in the swift current and a heavy squall and backs in broadside to the bank amongst the trees. With an angry snarl the mainsail rips clean across from leech to luff, and we have had our first accident of the trip. We anchor and gather it in, and, needing some stores, one of us starts up the launch to go ashore. There are a couple of kicks, a pop, and a fountain of hot water sprays the engineer in the face. The water-jacket, from some unknown cause, has cracked, and the launch is out of business temporarily. Second accident within five minutes.

As Georgiana Slough is the route by which we were to return, we ran into it under jib and driver, and tied up to the bank for the night a quarter of a mile beyond the drawbridge, which had opened for our passage.

The next morning, just as the pink dawn was coming in long stripes across the eastern sky, we breakfasted and then cast off. It was not as cold as it had been, and the barometer, which had been climbing hand over hand, now showed a tendency downward, which, together with other signs, led me to expect rain before long.

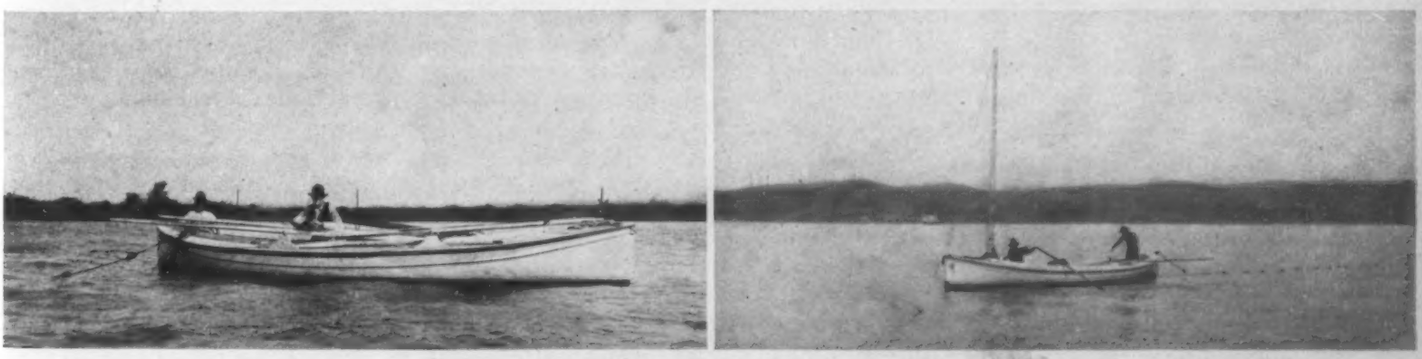
Georgiana is a twisting, doubling slough which separates Tyler and Andrus Islands, and, running for eleven miles through this fertile land, connects the Sacramento and Mokelumne Rivers, the latter a tributary of the San Joaquin. The current is always from the Sacramento to the Mokelumne, and on this morning ran four miles an hour. There was only the faintest northerly air, which, although it strengthened somewhat after dawn, was insufficient to give us steerageway at all times. Consequently, navigating through this narrow channel was rather a delicate proposition, as, with its twists and turns and elbows, it formed ingenious traps for a boat in irons. The slough itself is a remarkably pretty one, traversing, as it does, a rich, cultivated country, and from the cross-trees one seems to be looking upon a new world, so different is it from the accustomed haunts of one not bred on the river bottoms. There is practically no navigation on it of any regular sort, it only being used as a cut-off from river to river for launches and other small craft; for, though deep, it is very narrow, and too full of turns for anything but small boats. Its banks for much of the way are in a comparatively wild state, and lined with oaks, willows and other trees and shrubs, which, attractive now in winter, must present a beautiful appearance when clothed with the colors of springtime. Large, solemn-looking owls in considerable numbers were perched in the branches as we passed, and permitted us to come very close to them before moving. One of the classically inclined crew compared it to the Styx, and suggested that these were probably the spirits of former yachtsmen who had been foolish enough to attempt to sail through years before and had never gotten out. I refused to take so dark a view of it, however.

At 1 p. m., after a strenuous six hours, in which we had drifted stern-first, broadside, and almost every other way, when with the use of either the broken-down launch or the crippled mainsail we could have avoided all these harrowing experiences, we emerged into the Mokelumne, and, when well into the center of the stream, got to work on the mainsail. The mate proved very handy with the needle, and by the time we anchored off Coulton, a small steamboat landing on the San Joaquin, the job was done. That evening we were visited by two fishermen, one of whom left a fine striped bass with us, whose savory odors off the pan were soon filling the galley, and after eating which, tired out with our day's exertions, we slept soundly till morning.

Slipping down the broad San Joaquin in the early morning with little wind, we let ourselves relax, and reveled in a kind of modified *dolce far niente* after the strenuous life of the day before. The high fog which prevailed was clearing away before the advancing day, and around old Mt. Diablo, whose impressive outlines we had missed for several days, the wreaths of it were wheeling, shifting and manœuvring in graceful changing masses, like an army in review.

The mate was growing restless. Calls of business, he averred, demanded his presence in the metropolis. We construed the urgency of his departure as not altogether free from "a woman in the case." This he strenuously denied, of course; we all do; but, allowing him the freedom of choice due an officer, we hailed a passing fishing launch and shifted him into it, waving him regretful farewells as his figure grew smaller in the stern of the boat. We took uncommon interest in that launch, for it had the same style of engine that ours had. That is the freemasonry which will unite any two power boat men alive. Let their hulls be driven by the same make of engine, especially if it be a type not in general use, and the bond of interest waxes stronger as they compare its points of gas and oil consumption, speed, reliability, and what not. Two mothers with children down with mumps cannot find more in common.

That afternoon at five we anchored off West Island, just above Antioch, the air growing noticeably warmer and hazier, the barometer still gradually dropping. Next morning we went ashore for a few supplies, "Heinie" taking his first shore leave since touching at Rio Vista. As the launch ran up to the landing



SALMON FISHING ON THE SACRAMENTO.

her forefoot connected with one of the submerged stairs, and "Heine," standing with the painter in hand, was thrown forward, doing a beautiful spread-eagle and landing half in the water and half out, but with the pit of his stomach in violent contact with the submerged stair. The breath was completely knocked out of him, and, as he crawled out and on to the wharf, his appearance would have struck pity to a breast of stone. For a full half minute he rested on the pier in a posture highly suggestive of the statue of the dying gladiator after a shower until I could shut off the power and go to his assistance. Aboard the boat, we bundled him into warm blankets and gave him repeated jolts from the bottle that furnishes a panacea for all of the combined ills of the yachtsman. He nursed a very tender 'midship section for the balance of the trip, but was otherwise unhurt.

At 1:45 we were under way and making good time with the heavy current. Passing through New York Slough, a convenient cut-off from the San Joaquin to the main channel of the combined Sacramento and San Joaquin, we slipped down past Black Diamond and were soon criss-crossing the same water which we had traversed a few days before. Night was drawing on as we came abreast of Roe Island Light; but the wind was fresher, and we were overhauling, one by one, a fleet of scow schooners bound down, so we kept on sailing, fascinated with the night colors. At 8 p. m., with a strong beam wind, we passed between the lighthouse and gas buoy at the entrance of Mare Island channel, the water roaring under our lee bow, and, a half-hour later, had dropped hook in the soft mud on the Mare Island side, opposite the town of Vallejo, well under the lee of Mare Island and the buildings of the Navy Yard.

It is not strange that the yachtsmen of San Francisco Bay should find a fascination in this snug harbor, where they can mix with real sailors and take their time for colors from the big fighting machines that lie there. They are assisted in their endeavors by the Vallejo Yachting and Rowing Club, whose hospitality is unlimited; and he is a novice indeed who has not heard Judge Brown preface some vaudeville stunt with his usual droll remarks in the little club-house, bulging with humanity and reeking with tobacco smoke. Who is there on these waters who, having followed the game for a season, has not felt his heart warm to the reception of coffee, frankfurters and beans, in that boat-room downstairs, after hours of cold, dirty weather in Pablo, as, with numb fingers, he pulls ashore through the myriad of winking riding lights afloat on the deep, strong current of the channel? A book could be filled with yachting stories beginning "When we were at Vallejo"—stories droll and stories serious, stories of the little mishaps and larger calamities—all of which go to make the charm of the sport we love so well.

It was close to noon the following Sunday morning when, with the ebb and a light westerly wind, we fired a parting salute to the yacht club and slipped quickly down the channel, down past the Independence, now converted into a naval barracks, but her hull looking very much as it must have when she bore our colors aloft in the War of 1812. Soon we were around the jetties, and San Pablo Bay stretched before us, not rolling and boisterous, as it so often is, but smooth, save for the wrinkles cast up by the light breeze that blew across. And so we retraced the first day's journey without incident, and just as dusk picked up our moorings off the San Francisco Yacht Club at Sausalito.

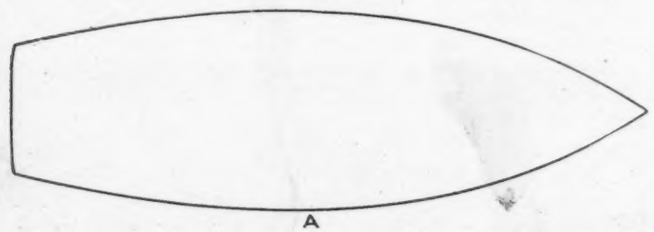
Some Light on the Dinghy Problem

POINTS TO BEAR IN MIND WHEN SELECTING A TENDER FOR YOUR BOAT—CAPACITY AS WELL AS SEAWORTHINESS AND EASE OF TOWING TO BE CONSIDERED—POWER TENDERS

By "NEMO"

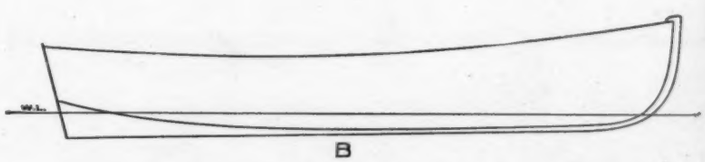
HOW often do we hear the question "What is the most suitable tender for my boat?" And to the man who lacks experience when he purchases a small sailing or motor boat it is really a very serious one. Possibly, in order to obtain such a tender as he requires, he visits one of the motor boat exhibitions or shows, and, although he sees tenders of all kinds, he is not apt to know which is most suited to his requirements. The flat-bottom tender or skiff, large enough to carry two persons on a mill pond where the waters are never ruffled, the dory type of tender that is seaworthy, the pretty little round-bottom boats about 3 feet in width that look very nice in an exhibition hall and are often designated as yacht tenders, the practical rowing tender, and the power tender suitable for yachts from 40 to 200 feet or more in length, are all shown, and when the person who wants to purchase a tender suitable for his yacht has looked them all over he often finds himself in much the same predicament as the man who tries to select his first automobile without having a friend with him who has been through the game—he sees so many different types and makes that he is bewildered. The tender that is suitable for one person would not meet the demands of another, and the man who owns an 18-foot boat does not need the same type of dinghy as the one who has purchased a 35 or 40-foot craft.

The simplest type of serviceable tender for general use in connection with a very small boat is a flat-bottom affair about 8 feet in length, with the bottom rounded up forward and aft. While these are useful for restricted purposes, there is no need for me to dwell particularly upon this type, and I will first take up what I consider to be the most serviceable type of tender which is handy, reliable and cheap; and that is the flat-bottom boat or skiff.



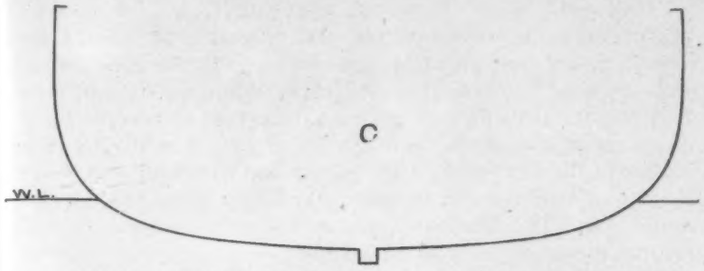
A

A WIDE BOAT WITH BROAD STERN MAKES THE MOST SUITABLE DINGHY.

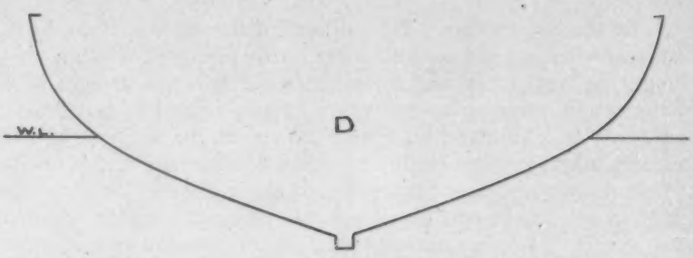


B

NORMAL SHEER OF A DINGHY, WITH BEARINGS CARRIED WELL AFT, INSURING STABILITY AND CARRYING CAPACITY. A GOOD TYPE.



MIDSHIP SECTION WITH GOOD FLOOR AND PLENTY OF FREEBOARD.



MIDSHIP SECTION WITH TOO MUCH DEADRISE AND TOO LITTLE FREEBOARD.

They do not require a great depth of water to float them, and by reason of this are handy to land in shoal places. Another good point in their favor is that they are easily hauled out on the deck or in the cockpit of a small boat if it is desired to carry them, and, if properly handled, they can be brought through rough water. As tenders for small yachts, they are very well suited.

One of the greatest drawbacks to this type of craft as a tender is that the majority of them do not tow easily or well. But this is not always the fault of the boat; it can, in many cases, be accounted for by the location of the fastening of the towline and the position of the tender in regard to the larger craft. Sometimes they are given too long a line, and at other times they are kept too short. If you want to find out where your tender tows the easiest, let out on the painter or towline until the boat is some distance astern and then haul it in until you finally reach a point where there is very little pull, and make it fast. Of course, if you have a following sea you cannot haul it up too close, as you will find that she will be driven up against the stern with considerable force by the following waves. You can thus see that the distance at which a tender should be made fast from the boat towing will vary with the conditions, and one will have to learn by experience the best position for the following boat. If this type of craft (the flat-bottomed skiff) is towed through the water at a high rate of speed, it has a tendency to raise the bow and settle at the stern, and when in such a position tows hard, making a heavy drag on the towing boat. It is a good plan to have a strong ring bolt in the stern of these small skiffs and tow them from that point instead of the bow, as they not only tow easier but do not sheer so much.

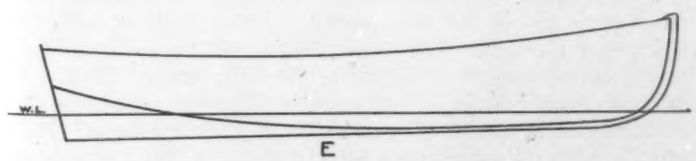
Skiffs suitable for tenders vary in length from 9 to 14 feet. In selecting one, take care that the bottom, at the after end, does not round up too quickly; nor should you pick out one that is nearly straight on the bottom. The sides, whether made in one, two or three strakes, should have a good flare. And, above all, do not pick out a narrow craft. The greatest width of the bottom should not be less than a quarter of the waterline length. A properly designed skiff 9 feet in length is capable of carrying three ordinary-sized persons in safety, and a 12-foot one should accommodate five or six persons.

The dory type of tender is in reality a smaller edition of the dory, and it is a well-known fact that dories will pass in safety through rough water that would even endanger large vessels; but in such cases you can make up your mind they must be handled by experienced persons. This type of tender has a narrow, flat bottom, and instead of having straight sides with a slight flare like the skiff, their sides are more in the form of an arc, being made up of three or four pieces to a side. They are buoyant, high-sided, tow easily, and, if properly handled, can be used with safety in very rough water, but to the uninitiated they often prove a delusion and a snare. They lack stability, and when you step into them it is advisable to step fairly close to the middle, otherwise you may have a chance to show your friends how well you are able to swim with your clothes on. I do not consider them suitable as tenders for small yachts, except in the hands of experienced persons; and one should bear in mind that, no matter how well versed he may be in handling boats, his friends, especially those of the fair sex, are not always adepts in the art of getting into a tender without upsetting it, and if you want your friends to enjoy themselves, they must be considered.

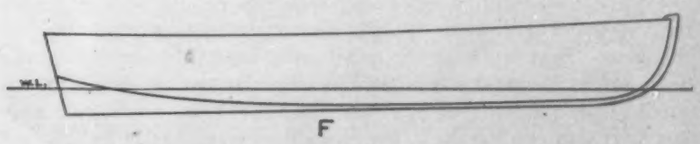
Outside of hauling a tender up on the beach or float, there is nothing built for all-round purposes so suitable as the round-bottom craft, and I will explain more thoroughly some of the points that should be considered in purchasing a boat of this type. When selecting one of these craft, take one with a good beam or width and a flat floor, or, in other words, one that is fairly flat amidship, similar to the section marked C in the drawing herewith. Do not take a boat with a midship section (which is at that point of the boat where it is the widest and deepest) like D, as such a craft has not a flat floor, and, consequently, little bearing until it is heeled over; whereas C has plenty of bearing, and would not tip to one side or the other as readily. The depth of the boat amidship is another point for consideration. It should be fairly deep (as C), with plenty of freeboard or height above the waterline, and not like the freeboard of section D. The bow and stern should be correspondingly high, to enable one to row such a boat in choppy water without having the small waves slopping aboard. Naturally, it is quite possible for a rowing tender to have too much freeboard; but I can assure you that such craft are in the minority, and the majority of the small round-bottom tenders are much too shallow.

Do not select a tender that is cut away too much aft; it is much better to get something with the bearing carried well aft, as in drawing B, instead of as E. The latter figure shows the line representing the intersection of the garboard, or the plank next the keel, with the keel, and I believe if you study it a trifle you will readily comprehend what I am explaining. The higher this line of intersection at the after end is situated, the less resistance the water presents to prevent it settling when weight is added by a person stepping into it.

The question of a suitable sheer, as the line representing the upper edge of the boat is called, is difficult to explain to one who is not acquainted with nautical terms, and the best way to describe



GARBOARD RAISED TOO HIGH AFT TO GIVE SUFFICIENT BEARING. SHEER AND FREEBOARD CORRECT.



SHEER TOO STRAIGHT, AND NOT ENOUGH FREEBOARD FORWARD AND AFT.

it is by the illustrations I have drawn of the sheers of two boats. B represents a good normal sheer, with plenty of freeboard or height, at stem, stern and amidship, while F is too straight to be practical or pleasing to the eye. If you intend to purchase a tender from a builder who is near enough to the water to be able to launch her, you can readily ascertain whether she is able or not. Step into her, and if she is cranky, or easily tipped, don't buy her. A good able 10-foot tender should be sufficiently stiff to admit of the weight of an average man standing on the gunwale or upper edge amidship without upsetting it, and by purchasing something of this description, you will secure a boat that is suitable, if the other conditions are about as set forth in the foregoing. A tender 12 feet or more in length would have considerably more stability than a smaller craft, and this would increase in proportion to the size of the craft, all other things being equal.

Some of you may wonder whether it is best to purchase a lapstreak, or carvel-built boat. In the lapstreak tender, the planks lap over each other—that is to say, the lower edge of one plank laps over the upper edge of the plank below—and the carvel-built boat is planked smooth. If you intend to carry your tender on davits, or it is to be kept hauled out on a dock or float for days at a stretch, the lapstreak tender is more desirable, as it is less apt to leak, and, for another thing, it can be built of much lighter material. The carvel-built boat, if kept in the sun, or where it is dry, will leak, as the shrinking of the wood opens the seams, and if you have a boat of this build hauled out keep a little water in it to prevent it drying up. Some of the small round-bottom tenders are built light and covered with canvas. This makes them practically proof against leaks, unless holes are cut in the canvas, which would not happen if they are given proper care. Owing to the limited space of this article, I cannot go into the details of construction, but will call your attention to another type of tender that is rapidly forging to the front, and not only has come to stay but offers great possibilities to the yachtsman in conjunction with his yacht.

The last few years has developed a type of tender that appeals to the lazy man as well as the yachtsman and power-boat enthusiast. What man is there who owns a boat and does not like to be lazy? That's what he goes boating for! The tender referred to is the one driven by a gas engine. These craft vary in length from 10 feet upwards, and are of inestimable value to the yachtsman. Think of stepping into your tender and running up rivers and visiting nooks and coves which are inaccessible to the larger boat on account of the depth of water! One can go ashore in the power tender even though the town be miles away; and on a summer evening, when there is scarcely a ripple on the water, one can go with this boat when not able to sail; and, better still, the owner of a sailing yacht does not have to depend on the "white ash" breeze, but by simply making the tender fast alongside and starting the engine the boat moves right along through the water. It is a steady pull and soon counts. Those who have been brought up with the sailing craft know its joys and sorrows, and realize how good it is to be able to make a harbor a few miles away, when the sun has set and the wind died out, without going through the laborious work of sculling the boat in with a sweep, or towing her in with the rowboat. At the best, this is decidedly hard work; whereas with the power tender it does not take long to make a harbor a few miles away.

I have no intention of going into the details of the power tenders, but I will try to explain what constitutes a good outfit of this type. Starting with the small ones, I would state that, while there are many good power tenders of about 10 feet in length, the smallest size should be not less than 11 feet—and preferably larger if you can handle it conveniently—so as to obtain the best results; that is, to have a power tender that you can tow properly and, in turn, can use for towing the large boat if the latter happens to be a sailing craft. The breadth should be about the same proportion as the round-bottom rowing tender, to which I have already called your attention, as should also the form of the midship section. The height of the freeboard at the stem should be a trifle higher than that called for in the rowing tender; for instance, an 11-foot tender built for power should be about 2 inches higher at the stem and a trifle higher amidship and at the stern. A 12-foot tender could be about 2½ inches higher at the stem; and so on. The freeboard need not be raised a great deal if a normal power plant is to be installed, but the faster you drive the boat the more need there will be for freeboard to keep out the spray.

The position of the engine is a very important point. If it is too far aft, the boat will set by stern; if too far forward she will not tow well, as she will be down by the head and will sheer from side to side. It should be a trifle forward of the center of the boat, and, by carefully arranging the seats, the accommodations of such a craft would be equal to that of a rowing tender of the same general dimensions, in spite of the fact that you have the additional weight and space taken up by the engine.

Do not try to make a racing boat out of an 11-foot tender. If you put in excess power you can drive them, but only at the expense of having a continual shower bath, which is not usually appreciated either by you or your guests. For an 11-foot tender, an engine that will develop 1½ to 2 horsepower is ample power for all ordinary purposes. A 12-foot tender, 2 to 4 horsepower; a 14-foot tender, 3 to 6 horsepower; a 16-foot tender, 4 to 8 horsepower; and from that size up to 40 feet and over, the power is a factor that can best be determined by the conditions that have to be met. Some of the 20-foot tenders are equipped with engines that will develop as high as 40 horsepower, and I have in mind one 40-foot tender that is fitted with an engine capable of developing 100 horsepower. Perhaps as I have mentioned the larger size of tenders, it might be well to state that the forms of these vary greatly, according to the conditions for which they are designed; therefore, you can consider that the shapes I mentioned as being most suitable are for small tenders, 11 to 15 feet in length, and not for the larger craft.

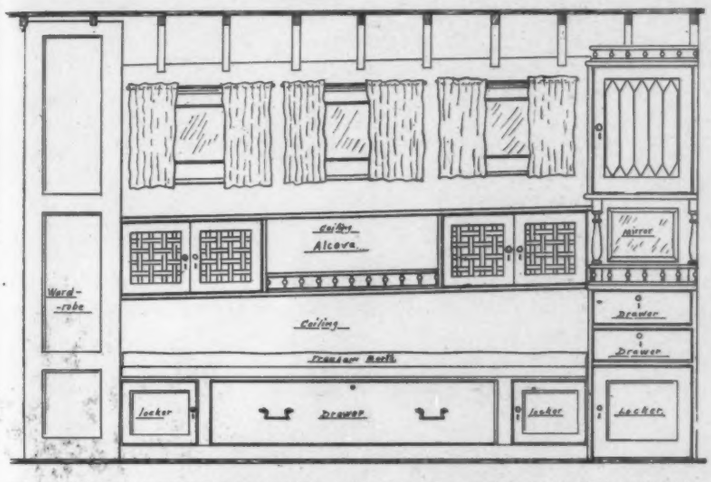
Omitting the question of anything over 16 feet in length but referring to the average small tender, one should bear in mind that the engine bed is so arranged as to bring the strain on such parts of the hull as will stand it without racking it to pieces. A couple of pieces of oak set on the frames is of little or no use. The planking and frames in the majority of these boats will give too much to insure the necessary rigidity. Where the engine is small and light the bed can be made of a couple of pieces of oak in the form of floors cut to the shape of the inside of the skin and securely fastened to same, and to the keel. The bearers, or fore and aft pieces, should be cut over these athwartship pieces and be securely bolted to them. For a light-weight 2 to 5 horsepower engine this is all the bed that will be required, but if a much larger engine is to be installed it would be advisable to make the bed with the fore and aft bearers of considerable length, and not only cut over the cross pieces but also skin-fitted and well fastened, so as to distribute the strain over a large area.

Have the shaft lined up accurately, so that there will not be a loss of power through same. Take care of the ignition system, and don't fail to use every precaution to keep flying spray and water away from the coil and batteries. It is an excellent plan to use one of the new waterproof coils, and set same in a box under the seat. The timer should also be protected from spray, and too much care cannot be given this matter. Even with the best of care, the engine on a small power tender has certainly to stand a lot of abuse. The tank should not be too large. These small engines do not consume a lot of gasolene, and the tank can easily be replenished. Too much gasolene, if the tank is in the end, is as detrimental to the boat as adding weight at either end.

The Interior Equipment of Power Boats

By R. M. HADDOCK, N. A.

IN considering the interior equipment of the modern cruising power boat, especially those craft that range from 30 to 50 feet in length, the utilization of the limited space at hand so as to secure accessibility and a maximum of stowage is a point that is of paramount interest to those who spend two or three months of the season afloat in craft of the dimensions above mentioned. While a boat with very little locker and stowage space will do for short cruises of a week or so, nothing is more trying than to have to live for a longer time in a boat where things are lying around on the transoms and in corners and have to be



TRANSOM ARRANGEMENT ON TRUNK CABIN BOAT, SHOWING ALCOVE, LOCKERS, WARDROBE, DRAWERS AND SIDEBOARD.

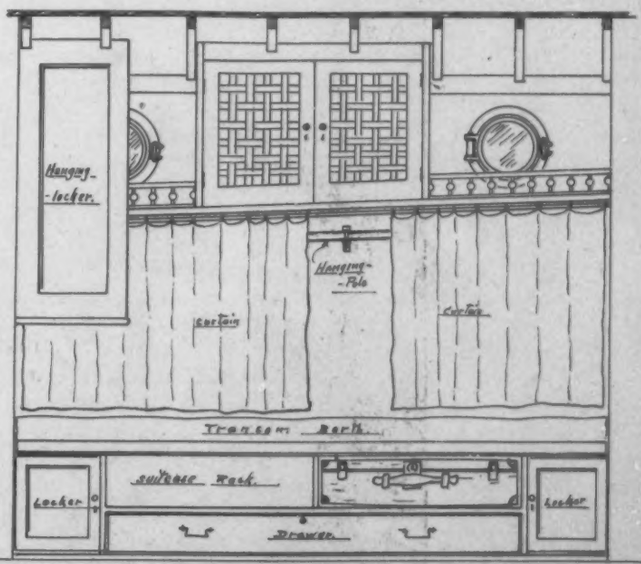
moved about from place to place or picked up from the floor, where they invariably get sooner or later.

A very common fault that exists in a great number of the smaller cruisers of to-day is the lack of hanging wardrobe space and of locker space so arranged that one can readily secure any desired article without hauling over many unneeded ones. This comes from various causes, being sometimes due to trying to secure too much sleeping accommodation in a boat of limited size, sometimes by a lack of appreciation of its value by the owner, and frequently from carelessness and a desire to do as little work as possible on the part of the builder. When it has been omitted as a first-cost consideration, it is a short-sighted policy, as these things are added from time to time at a greater cost than they would have represented at the time when the boat was being built, and, also, they usually show that they were an afterthought and seldom harmonize with the rest of the cabin, detracting much from the selling price of the boat. Two or three feet added length entirely devoted to such use will be found of inestimable value, and will be especially appreciated by any ladies that may be aboard.

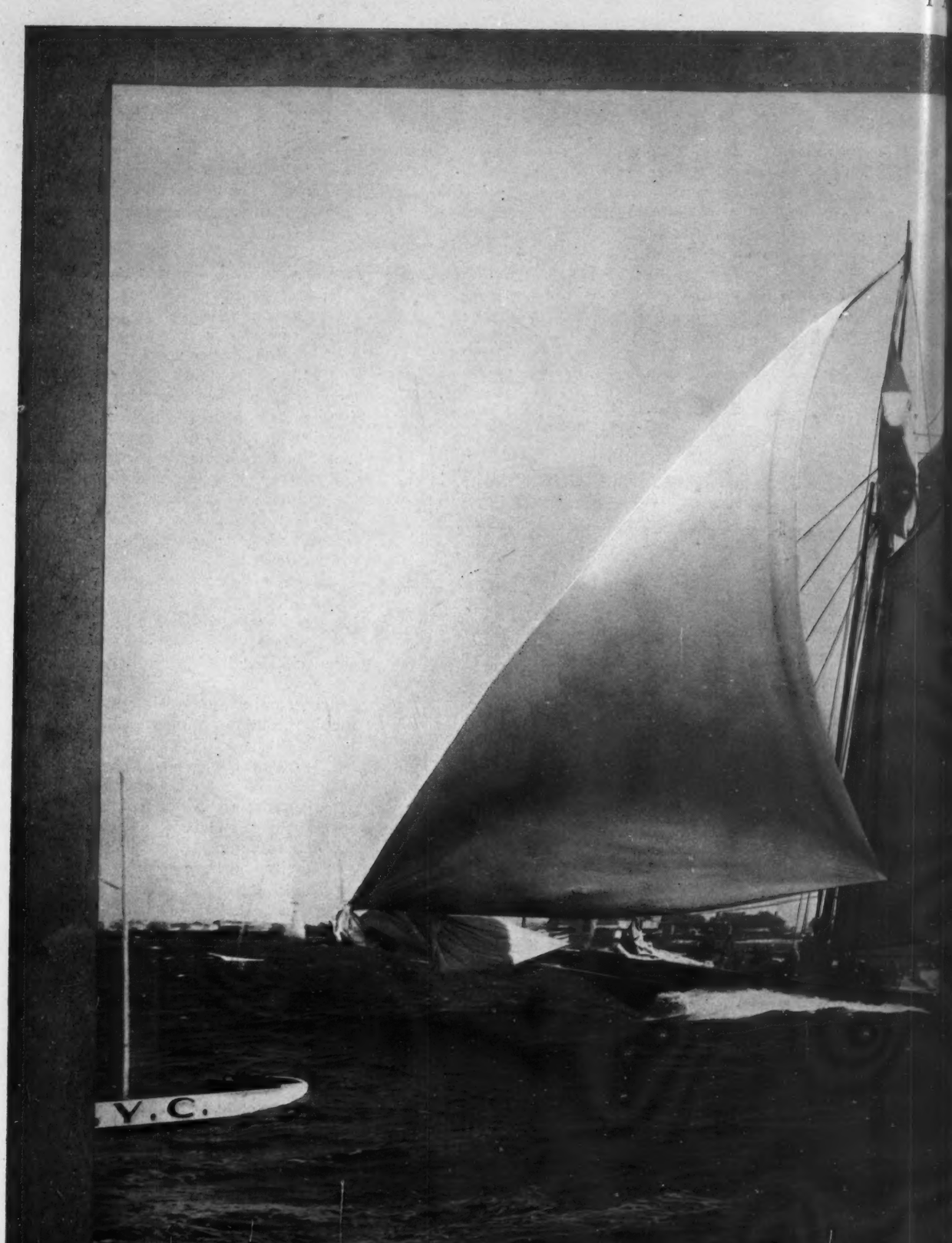
In boats that have a low trunk cabin with 12 to 18 inches of deck on each side there is always a chance to run a shelf 10 or 12 inches wide below the deck and parallel to it, with a locker at either end and an alcove with a rail across the front in which to keep small articles. The doors of the lockers can be made very attractive in appearance if leaded glass is used, or a latticed panel. These lockers will hold many things, and will keep them off the transoms, adding much to the tidy appearance of the cabin. For this reason it is preferable to have lockers with doors than open racks, as a varied collection of small articles seldom can be made to look well, no matter how carefully they may be arranged.

In boats of the raised-deck type where there are no side decks a shelf 6 to 8 inches wide can be run along the clamp below the ports. On this shelf a locker can be built in between the ports, extending up to the roof ceiling, with a rail about 3 inches high extending across the port space, leaving the port in a sort of alcove, the railing being supported on turned spindles. Below the shelf an ordinary wooden curtain pole should be fastened about 4 inches down, over which blankets and clothing can be folded and hung where they are out of the way and not likely to be mussed up, being concealed by a curtain from the front edge at the under side of the shelf reaching to within an inch or so of the cushions. Hanging lockers with one or two shelves can be placed on the bulkheads at either the foot or head of the berths, and, as they do not reach down to within a foot or 15 inches of the cushions, do not interfere with the sleeping length, and will hold a great many things. These can readily be placed in boats that have been built without them, and will prove convenient in many cases.

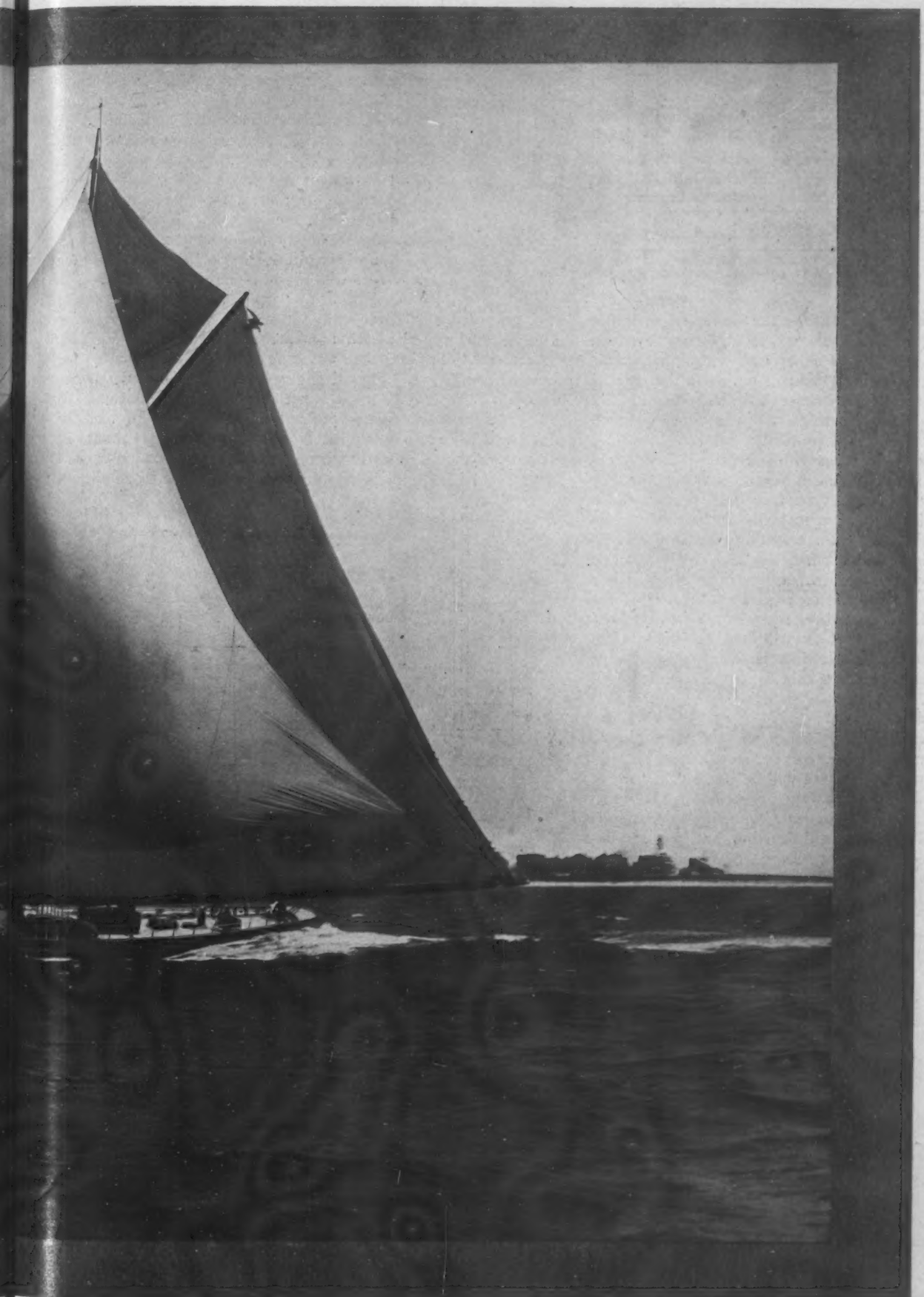
It is always desirable to have drawers under transoms and berths in which to keep clothing and other things, as they are handier than locker lids on top of the transoms, where one must lift up the heavy cushions in order to gain access to them. Besides, clothing in drawers is better protected from the dirt that will work down the ceiling of the hull and accumulate on the flooring, and from any bilge water that may chance to get above the floor, due to rolling in a heavy sea. If the form of the hull is such that there is not room for a drawer under the berths—as, for instance, in a stateroom up in the bow—hinged doors, with spring hinges on the bottom and a catch at the top, will give the same appearance as drawers, afford easy access to the stowage space, and cannot be left open to stumble over, as is the case with doors hung on the sides. The drawers should be made to slide easily and have a spring catch to keep shut when the boat



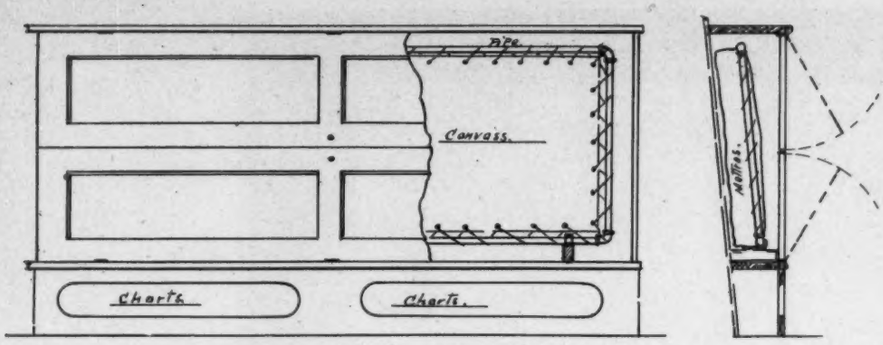
TRANSOM ARRANGEMENT FOR RAISED DECK BOAT, SHOWING SUITCASE RACK, DRAWERS, LOCKERS, SHELF AND HANGING POLE.



SCHOONER LASCA CROSSING F OFF



OFF ATLANTIC YACHT CLUB.

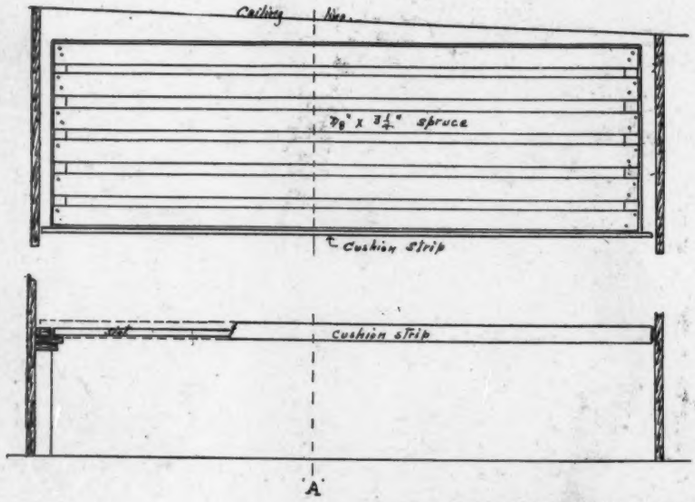


AN ARRANGEMENT FOR PIPE BERTH FOR CABIN, CONCEALED DURING THE DAY BY HINGED PANELS.

is rolling. In most small cabins where the berth length is but little over 6 feet, one long drawer, about 3 feet 8 inches or 4 feet, with a locker with hinged door at either end, will be preferable to two short drawers not over 30 inches long, as in the case of the long drawer one can lay out trousers, shirts, etc., at full length, avoiding folding and creasing—a distinct advantage on the water, on account of the ever-prevalent dampness.

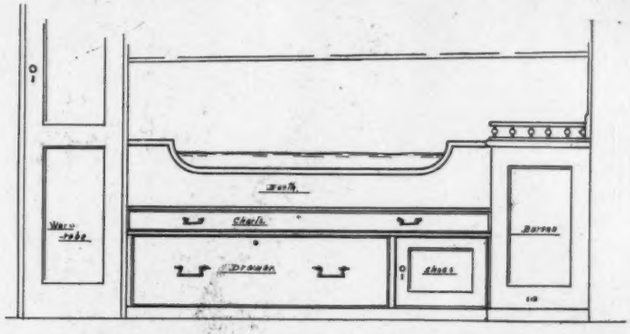
As it is usual for guests to arrive with suitcases, it is very desirable to have a place where these can be stowed out of the way and yet be readily accessible, as they are frequently needed. This can be accomplished with a transom 16 inches in height by placing a shelf about 7 inches below the transom top, still leaving room for a drawer 6 inches in depth below it. This will allow two suitcases to be stowed under each transom or berth, where they can be easily slid out and in much after the manner of the drawers themselves. In a larger boat there should always be a place provided for these cases which will be accessible at all times, arranged with shelving and having the doors open on some passageway. If possible, provide a shoe locker in some accessible place where guests can keep their shoes when wearing those of the rubber-soled variety.

It will add much to one's comfort in sleeping to have the tops of the transoms made from slats of pine or spruce about 7/8" x 3¼" instead of from solid boards, as there will be just sufficient give with a 4 to 5-inch cushion to make an easier bed and still not so much as to make it too springy for a seat. In this way the top is also much lighter to handle when drawing out for an extension berth. A piece of light canvas or denim can be tacked over the top to prevent dirt, etc., from working through.



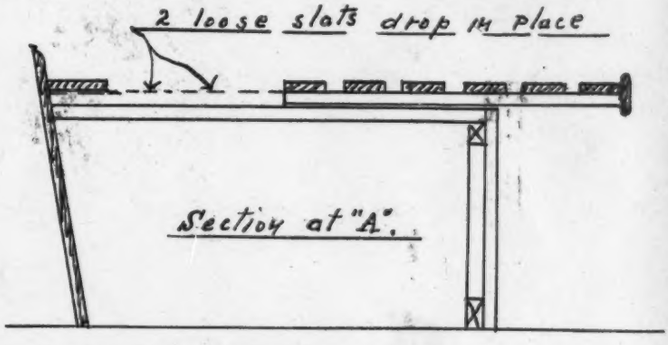
In a general way light effects are more suitable for the interior of small boats and the lighter colored woods should be chosen. An all-mahogany interior is apt to be dark and depressing, especially in cloudy weather, and makes the interior seem small and stuffy. A combination of white enamel paint relieved with a mahogany trim is particularly good, as is also the use of mahogany styles with butternut panels. Of course, there are many other suitable woods, such as ash, oak, birch, cherry, maple, pine, beeches, and many others that can be utilized for interior work. It is well to leave poplar or whitewood alone in all boat work, as it is too prone to warp and check. Staining the wood to a green or silver gray proves advantageous in some cases, producing very pleasing and artistic effects.

As to the floors and their coverings, this is also a matter for personal preference. For an engine-room floor linoleum is the best, as it is impervious to oil, is not slippery, and is odorless. It should be tacked in place with a brass binding to protect the edges, and where there is a hatch or trap in the floor it should be cut out and tacked so as to lift up with the loose portions. If a carpet is used in the main cabin and stateroom, one of small pat-

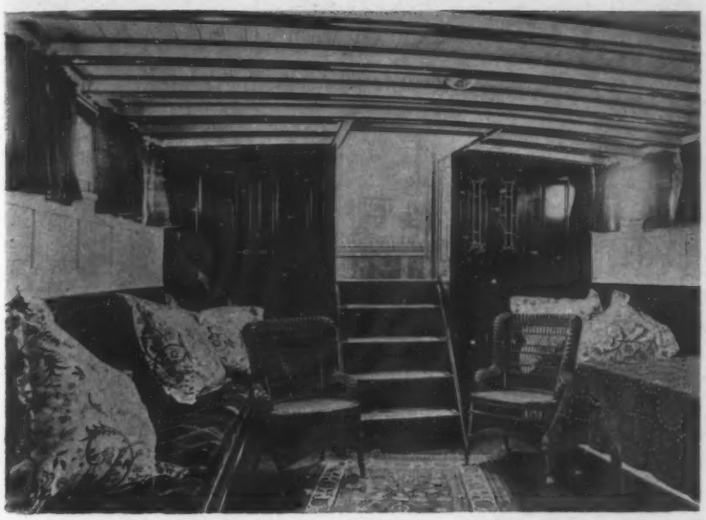


"Showing Berth with Chart-drawer shoe-locker, wardrobe and Bureau."

tern should be chosen. A plain one looks by far the best, but shows every bit of dirt, so an indistinct marking will avoid this fault somewhat. The writer prefers a hardwood waxed floor in all parts of a small boat, as it is most easy to keep clean, and water from wet bathing suits can be easily mopped up without injury to the finish. This kind of finish is easily and quickly renewed. Also, a rug or two can be used that can be taken up, shaken, and readily thrown aside to avoid wetting. Of course, carpets, rugs, cushions and hangings should harmonize, and some of the shades of old blue, the grays and a pale green should be preferable to the old standard moss greens that have been in use for so many



AN EXTENSION TRANSOM BERTH MADE WITH SLATS INSTEAD OF SOLID BOARDS.



INTERIOR, SHOWING GOOD WARDROBE AND LOCKER ARRANGEMENT AT AFTER END. WHITE ENAMEL AND MAHOGANY TRIM MAKES A GOOD FINISH.

years. Some people advocate lining the silk curtains on account of fading; but, as this tends to make them heavy and stuffy, the writer prefers to let them fade and replace them each season, as in small boats the cost of this is immaterial.

There are many cushion fillings, such as hair, felt, moss, cork and other patented combinations; but a good hair mattress or cushion seems to be most satisfactory in the end. Sometimes half cork is used, in order to make the cushions serve as life-preservers. This is very good in small boats, but where there is room for stowage of the regulation life jacket I should prefer to eliminate the cork from the cushions, as it does not add to their softness. A velour or a corduroy makes a good covering where used on transom berths, and materials that are more or less impervious to water should be selected, as it is almost impossible not to get some dampness below in rainy weather. For seats in cockpit and engine room, leather, or some of the imitations of it, makes the best cushion coverings.

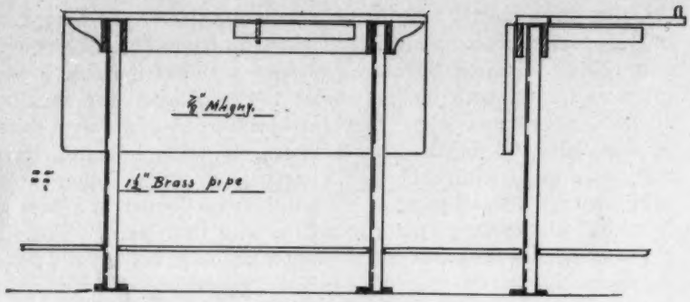
The toilet-room fixtures should consist of a pump closet, a lavatory, mirror, and a shelf for brushes, etc. This latter is best made of glass or porcelain, as it is then impervious to water and easily kept clean. If a folding wash-basin is used, it had better be of porcelain, even though more expensive. The nickel ones are hard to keep clean, especially when used on salt water, as the nickel quickly corrodes. It is wise to have the waste to the basin piped directly overboard at or below the waterline, as, if piped to the closet basin, it has to be pumped out each time, and is liable to overflow if forgotten, and always makes an untidy-looking hopper in the closet. Seacocks should be fitted to all the outboard connections, so that they can be shut off in case of accident. If possible, a locker for towels, etc., should be fitted.

DETAIL OF SIDEBOARD AND BUFFET

Galley fittings vary considerably with the size of the boat, and in the smaller craft are usually located in some part of the engine room. Most of them are provided with refrigerator, stove space and sink, with lockers under the two latter for cooking utensils, provisions, etc. The refrigerator should have thick double walls and an air space between, or, what is better, have this space filled with cork, felt, charcoal, or some other non-conductor, as a small piece of ice will last far longer in a box of this kind than a large piece in a box with thin walls. The ice chamber should be above the provision chamber and should have the drain pipe led overboard, as it is bad practice to drain into the bilge, which should be kept as clean as other parts of the boat. The stove space and space around sink should be lined with sheet brass or copper as a protection against fire. If a gasolene stove is used, the fuel tank should be located at some distance from the burners, a bulkhead or closet side intervening. The filling pipe can extend through the roof and can be filled from the outside, making a safe arrangement. They are cleanly, give a hot fire, and do not smoke the utensils. There are many good and safe kerosene and alcohol stoves that work under pressure and give a clean, blue flame. All these stoves must be started by heating the generator with alcohol, and failure to get a clear blue flame is usually due to insufficient heating in the first place. If one makes it a rule to use double the amount of alcohol in priming—that is, fill the cup provided twice and allow it to burn out—little trouble will be experienced. A small "Shipmate" range is also very convenient and adds much to the comfort, owing to the fact that baking can be done with it. They are made in sizes to fit even the smallest galley, and, where any cruising is done in the spring or fall, have the advantage of being able to heat the cabin. A good combination is one of these ranges with an alcohol or kerosene vapor stove for use in preparing quick meals.

A small sink, piped to the water supply and drained overboard, is a great

A WELL-ARRANGED CHINA LOCKER WHERE SPACE IS AT A PREMIUM.



DETAILS OF A DROP-LEAF TABLE.

convenience in boats where there are only the ports to throw things out of. In size it should be about 6″ deep by 12″ x 15″. It should be made of tinned and burnished copper and need not be rectangular, but can conform to the shape permitted by the form of the boat. Underneath, a shallow drawer for knives, forks and spoons and the like will be very handy.

A lamp locker with zinc lining should be placed in the engine room, as this lining keeps the wood from becoming saturated with the oil. There should also be a locker for the tools and one for waste. It is a good idea to line the waste locker; but, as no oily piece of waste should ever be returned to this locker, it is not absolutely necessary to line it.

As the engine room is frequently long enough for sleeping length, but of insufficient length to have a berth alongside the engine, a pipe berth with a mattress can be installed, to fold up against the side of the boat and closed in with panels in the daytime, projecting only about 6 inches into the boat and giving good room around engine for a passageway. This can be readily let down for use at night. As this makes a most comfortable berth, the idea can be utilized to advantage elsewhere than in the engine room, as it practically forms a Pullman berth. A berth of this kind can sometimes be arranged over the ice box and stove space, to be used in an emergency.

The matter of the cabin table is one that depends largely upon the size of the boat. For the smaller craft a four-legged table that folds after the manner of the small sewing tables is about the best, as it can be used either in the cabin or in the cockpit. A place to stow it securely should be provided—either under the transom, after the manner of the suitcase shelf, or alongside some closet bulkhead. The most common type of table in use, and one that is very good and practical, is made with two pipe legs that ship into steps through holes in the floor and has a drop leaf on either side. When the leaves are down it is only about 6 inches wide and is not much in the way. This table can also be removed and stowed; but, of course, can stand only where the steps are provided. It cannot be upset by the rolling of the boat, which is a very desirable feature.

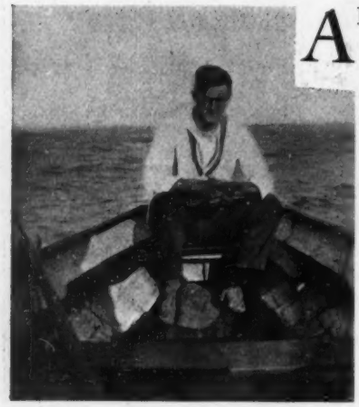
All cabin hardware should be of brass and of the best quality obtainable. The plainer the surface, the better, as they are more easily kept bright. It is a decided advantage to have all the door hinges either loose-joint or loose-pin butts, so that doors can be removed without taking out the screws. The lighting fixtures should be placed near the roof and out of the way, where there is no chance of running into them or striking them with one's head. It is hardly within the province of this article to go into a discussion of the relative merits of electricity and acetylene gas as a lighting medium. Both systems have their advantages. On the score of safety from gasolene explosion electricity has a distinct advantage, as it avoids the frequent striking of matches and the flame is not free to the air. Still one has to light the galley stove, and there you have the unprotected flame in the boat. The principal disadvantage of the storage-battery system is that if the boat is not run frequently you have no light. Small boats can be lighted from a primary system that would not require more than one renewal a season, using about a 6 or 8 candlepower lamp. This system obviates the necessity of charging every time the boat is run, and one can have a light when lying in port as well as when running. This is true of acetylene gas, and you have a brighter light with a minimum of trouble and equipment. In either case a few good oil lamps should be on hand in case something goes amiss with the other systems.

Chairs in a small cruiser, except for the cockpit, are usually a nuisance, though in boats above 40 feet they can be used to advantage. Wicker or willow are the best types, being light and strong, and add a good deal to the appearance. The wickerware manufacturers are now making small sizes of these chairs that are especially suited to the smaller boats.

Southward Under Power and Sail by the Inside Route

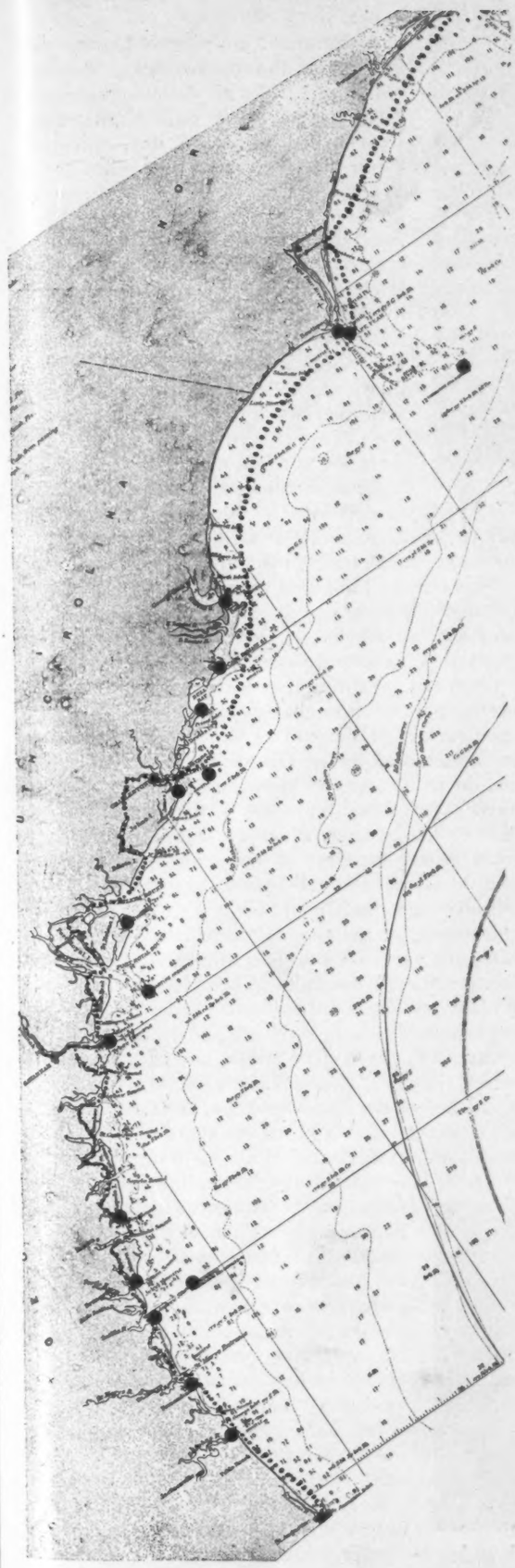
PART III—FROM BEAUFORT, N. C., TO ST. AUGUSTINE

By A. M. FARRELL



AFTER procuring an ample supply of stores at Beaufort, N. C., to take us to our next stop, Charleston—a distance of 200 miles on the Atlantic—we made for the Alga with the intention of leaving the first thing the next morning. But during the night the wind increased, and by the time we were to start the ocean was too rough for any small boat. We decided, therefore, to remain until we had favorable weather, as we did not care about taking undue chances. It was blowing a hard southwester from just the direction we had to go to make Charleston, from which point we would have the inside route again to Florida. We were sure when the fishing schooners would not venture out that it was too bad for us.

We remained in Beaufort four days, hoping every morning to get away. On the fourth day the wind died down considerably, so we made a start. We got out on the Atlantic through the inlet about nine o'clock with a very light breeze, having all sails set and the engine going, for we did not want to lose any time in getting over this exposed part of our journey. About noon we got a good breeze, and, with our engine running, we made about 8 knots an hour. Later on in the afternoon we got our regular southwest squall, to which we were now beginning to get accustomed. We were then about five miles from New River Inlet, and, heading for it, we reached there just before dark. We had to climb the mast here in entering to find the channel, as the charts tell you that the sand bars frequently change in the heavy blows, and, by climbing the mast, one can see the channel very distinctly. We found a good harbor here, and laid quietly during the night.



ROUTE OF ALGA FROM BEAUFORT, N. C., TO ST. AUGUSTINE.

For a change, we got up and were on our way before daylight, and, having a light breeze ahead at the start, we could not complain of the distance we covered that day. Late in the evening we got our usual blow. These seemed to come up like clockwork, and by this time we were getting enough of the Atlantic and were wishing for the inside route once more. In a short time it had kicked up a high sea, and, as we had just passed Rightsville Inlet, which, we were told, was easy to enter, we turned back and made for a harbor there, the tide being on the flood. As we reached the mouth of the inlet our engine stopped at a very critical moment. Lang could not get it to work, and, as we were drifting inshore all the time, we let go the anchor, which held well. We finally got the engine started (but expected it to stop any moment), and began taking in the slack on the cable. We went about a mile up the inlet and tied up at the wharf of the Rightborne Hotel, on Carolina Beach. This beach is a summer resort near Wilmington, being only about a half-hour's ride from that city. At this time the people were just beginning to arrive for the summer, and, as the weather was so uncertain for continuing the trip, we decided to remain until it became more settled. We laid up in the inlet for about a week, becoming acquainted with the members of the Carolina Boat Club, who showed us all courtesies possible.

We finally left the inlet with a southeast wind; but, as our course was southwest, we made a good run to Cape Fear. Reaching it early in the evening, we steered a direct course for Little River Inlet for a night's harbor. At the mouth of this inlet is Bird Island, which you can pass on either side, as there is plenty of water. Of course, you have to look out for sand bars; but, with good judgment, you can enter it safely. We entered on the north side and came out on the south side of the island. At five o'clock the next morning the ocean was like a looking-glass—not a ripple on the water; but after we had gone about ten miles a little breeze sprang up, and we were able to cover about sixty miles before dark.

We were then off Georgetown Light, and, not wanting to stop there, we decided to make a night run, and figured on reaching Charleston some time the next day. After proceeding about five miles, a red flashing light became visible. This light was not on the charts nor in the lighthouse book, so we were puzzled for some time to make out where we were; but, looking over some of the lighthouse supplements that we received from the Hydrographic Office, we noticed that a red flashing light was to be erected at the end of Georgetown jetties, and concluded that this was the new light. This was our first night work, and everything was in our favor—a good breeze, engine working well, a bright moon—and at daybreak we were passing Cape Romain Light, and, a little later, we picked up Bull Bay Light. About seven o'clock the wind fell light, though we made good progress. While passing Rattlesnake Shoal the water was very clear and appeared to be shallow, but a cast of the lead showed us that there was 20 feet.

Entering the main channel to Charleston, which is well beaconed up to the city, we had a free run and a strong tide with us, and anchored off the Carolina Yacht Club early in the evening. Charleston has a good harbor, well protected and roomy. Here is where we picked up the inside route again, which we preferred to the open water.

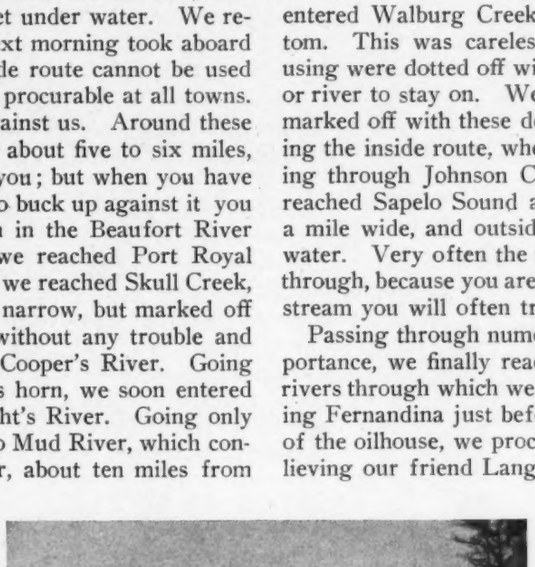
Stores and oil being on board, we left Charleston and soon reached Wapoo Creek. There is only about five miles of this creek before reaching Elliott's Cut, which leads into the Stono River, one of the worst places we had so far come across, being filled with sand bars. We struck several times in this river trying to cut corners, which is a bad habit some yachtsmen have. From the Stono we entered a narrow cut called Church Flats. Owing to this cut being very narrow and shallow, we soon stuck in the mud and waited two hours for the tide to float us again. About dark it lifted us off and we went on to Young's Village, on the Wadmotaw River, where we anchored for the night. About six miles from here is the Dawho River, which we reached the next day about an hour after starting. In entering here one has to follow the range beacons very closely, which is easy to do, as they are large and readily distinguished. After about ten miles in this very narrow and crooked river we reached the South Edisto River, which is about a half mile wide and has many bars. We noticed about this time that the wider the stream the more trouble we had keeping off the bars; when we got into a river about a hundred feet wide we would have, on an average, 10 feet of water and seldom a bar

in it. Next we came to the Ashepoor River. There are two entrances to this river; one you come to after going down the South Edisto about five miles (this is the longest and the shallowest), while five miles further on you come to the other entrance, which is a cut dug by the government, and has about 10 feet of water, by taking which about ten miles is saved. Going through this cut, we reached the Ashepoor River proper, and, after covering a short distance, we came to St. Helena Sound. Here there are a great many sand bars, but all are well marked.

We had a good sail through this Sound, and reached the Coosaw River, where we had fifteen miles of favorable wind and good sailing. It is impossible to do much sailing in these shallow waters if you do not have a favorable wind. Brickyard Creek was the next stream we came to—somewhat narrow, but with good water—until we reached Beaufort, S. C. Before reaching this city an old negro fishing in the river asked us to give him a tow back, as the tide was against him. It was fortunate for us that we helped him along, as, just before reaching Beaufort, there is a wreck of an old steamboat, with only the smokestacks above water. Thinking we could pass near it, we did not change our course until the old darky hailed us to sheer off quickly. We did as told, and found the hull of the wreck but a few feet under water. We remained at Beaufort that night, and the next morning took aboard an extra supply of gasolene, as this inside route cannot be used very much for sailing and gasolene is not procurable at all towns.

ON THE ATLANTIC, BELOW CAPE FEAR.

Leaving here, the tide, as usual, was against us. Around these waters I should judge that the tide runs about five to six miles, and it is all right when you have it with you; but when you have a small engine and a large boat and have to buck up against it you find progress very slow. We were then in the Beaufort River and had about a ten-mile run before we reached Port Royal Sound. Here we did a little sailing until we reached Skull Creek, another place where the channel is very narrow, but marked off with range beacons. We got through without any trouble and entered Cali Bogue Sound and then the Cooper's River. Going through a little river, crooked as a ram's horn, we soon entered New River, and presently came to Wright's River. Going only a short distance in this stream, we came to Mud River, which connects Wright's with the Savannah River, about ten miles from the city of Savannah. Soon after entering the Savannah River it became dark; but, as we wanted to reach the city that night, we kept right on. The night was dark, but the river was well marked with lights, for there are many bars, and, in several places, wrecks, near the channel. Just before reaching the city there are two large red range lights, and, by following them closely, we had no trouble. It is not as easy to enter a place at night for the first time, with so many strange lights to follow, as it is by daylight; but we took the chance, and, watching the charts closely, we were up in the city by eight o'clock, where we tied up alongside a barge and were soon in our bunks.



THROUGH THE INSIDE ROUTE BACK OF THE ISLANDS OF THE SOUTH CAROLINA AND GEORGIA COASTS.

At Savannah we procured charts for the rest of the inside route, and, after taking on all the provisions needed, we spent a couple of days sight-seeing. Leaving on the third day, we went down the river about nine miles to the Wilmington River. The chart says to go all the way down this river to Warsaw Sound and thence to Vernon River through several other waterways. But lately a new route has been established by which ten miles may be saved. This is by way of the Skidaway River from the Wilmington River and through a new cut, called Skidaway Narrows, well marked off with range beacons. By taking this cut you not only save distance, but find deeper water.

We next entered Brunswick River, then turned into the Vernon River, and it was not long before we came to Hell Gate. On entering this, there is an island in the center, on each side of which there is supposed to be good water. Holding our course to westward of it, we went aground in short order; so we came around and passed it to the eastward without trouble, having good water until we reached Florida Passage, where we encountered some bars, but a boat drawing 3 feet can get through by kicking up a little mud. Bear River came next, then through Catherine Sound until we entered Walburg Creek. At the end of this creek we hit bottom. This was carelessness, however, for the charts we were using were dotted off with the route, showing which side of creek or river to stay on. We noticed that most of the later charts are marked off with these dotted lines, which are a great help in taking the inside route, where there are so many bars to avoid. Going through Johnson Creek and the South Beaufort River, we reached Sapelo Sound and the Mud River. This river is about a mile wide, and outside of the channel there is only 1 foot of water. Very often the narrower the place the better you will go through, because you are more careful. When you get into a wide stream you will often try to cut corners and get aground.

Passing through numerous sounds, rivers and creeks of no importance, we finally reach the Amelia River, one of the prettiest rivers through which we passed, its banks being very hilly. Reaching Fernandina just before dark and tying our boat to the wharf of the oilhouse, we proceeded to a nearby restaurant, thereby relieving our friend Lang from kitchen duty. The distance from Savannah to Fernandina is about 100 miles, but by taking the inside route we had covered a distance of close to 300 miles. But for a small pleasure boat the inside route is the best, the scenery being well worth while, and you can always lay up at night in a good harbor. Having made good use of our engine in these small rivers, our gasolene was about exhausted, and again filling both tanks and the extra cans on board, we were satisfied that we were ready for our next long run.

Leaving Fernandina the next morning for the St. John's River, a distance of thirty miles, we had a good sailing

(Continued on page 460.)

The Lady Maud, Schooner Yacht

A NARRATIVE OF HER LOSS ON ONE OF THE BAHAMA CAYS, FROM THE ACCOUNT OF A GUEST ON BOARD

By W. CLARK RUSSELL

CHAPTER X

UNTIL the morning of the —— of July, that day making it over five weeks since we had sailed from Southampton, nothing happened that is worth recording. But on that morning the Lady Maud, being then under a mainsail, foresail, and two jibs, the wind to the northward of east, and fresh, a squall blew up, and, half an hour after, a heavy gale of wind had stripped us of every fragment of canvas, saving the close-reefed foresail; but the wind increasing in fury, this had to be furled, and we lay breasting the monstrous seas under bare poles, our topmasts housed, and the yards on deck.

Taking it altogether, the gale was as fierce a one of its kind as I ever remember; never, indeed, approaching the force of a cyclone, though at midnight it came very near to being a hurricane. For hours and hours the ocean was like wool, and the sky like ink, The heavy seas which rolled up carried the yacht bodily away to the westward, and I reckoned that the average drift of the vessel was not less than one and three quarter nautical miles an hour for hard upon seventy-two hours.

The gale blew for three days, and they were the worst three days that I ever had passed. The Lady Maud, though a powerful boat, and large for her class, was but a small craft to fight such a sea as then ran; nor did she make the weather we might have hoped from her beam and sheer.

There were times when her plunges left nothing of her visible but her after-deck down to a few feet before the mainmast; she looked to be smothered in a boiling caldron; and one of those seas tore up the whole length of starboard hen-coops, and shot the fragments overboard like a flight of arrows, and robbed us of two dozen of fine poultry.

Our condition was truly pitiable. It was the worst part of the storm. The gale was like a sirocco for the temperature of it, and the cabin, with the skylight closed and the companion shut to prevent the water from washing down, was hot enough to bake a joint in. But add to this intolerable atmosphere the frightful pitching, the sensation of being shot into the air with terrific force and velocity, and then falling with such headlong, sickeningly swift descent as to make you hold your breath with the belief that the hull would split open as it crashed into the deafening hollow, whilst the whole fabric rang with the howling and roaring of the tormented seas outside, and the raging of the furious blast along the dark sky; and every now and again there would be a deadly pause in the yacht's motion after one of her wild plunges, as if the sea she had shipped over her bows, and that had washed aft in a tempest of foam, had proved too much for her, and she was going down. Add this, I say!

No skill, no experience, was of any avail at a time like this. The yacht lay under bare poles, and the helm lashed, and whoever happened to be on deck to watch her stood right aft, for the seas which swept the forecastle made that part of the vessel as perilous as a raft, and no man could have staid there without being lashed; nay, even then, he would have stood the chance of being drowned by the perpetual flying of water over him.

But our miserable condition below was lamentably aggravated by Lady Brookes' agony of apprehension. I believe, had the gale lasted another day, she would have died of fright. No food that I heard of passed her lips. She lay upon her swinging bed, moaning and screaming, until the power of making those noises failed her. At one period, indeed, her mind grew deranged, for I afterward learned that she had charged her husband with bringing her on this voyage merely to kill her, and stormed and raved at him until he ran in a state of distraction from her cabin.

His distress was truly deplorable. Between the horror of the gale on one hand, and the alarming state of his wife on the other, he lost all nerve. I remember on one of those evenings being alone in the cabin, listening to the terrifying and thrilling bursting of the seas against the groaning, struggling, staggering hull, and very gravely doubting whether any of us would ever see the sun rise again, when Sir Mordaunt came through the door that led to the sleeping-berths, and passing his arm round an iron stanchion, stood looking at me without speaking a word, and his face as white as death. There was an expression of horror in his eyes which made them singularly brilliant and affecting to see, and I then took notice that he appeared to have aged by at least ten years since the morning.

"Come, come," I exclaimed, encouragingly, "let us keep up our hearts, if only for the sake of the women. You know Jack's old saying, 'While she creaks she holds.' "

"That may be," he replied, in a wild manner; "but oh, Walton, it's killing my wife! its killing her! it's killing her!" he repeated.

As I had not seen her, she having kept her cabin from the first hour of the gale, I could not offer an opinion; but had she been anybody else but his wife, I believe I should have told him that a woman who could make such a hullabaloo as she had raised was not a person to die off in a hurry.

"Oh, Walton," he continued, "it's a dreadful blow to have my hopes defeated in this way. I brought her against her will, and yet God knows I acted as I thought for the best. Even should this miserable gale leave us alive, it will have upset all the good she has derived from the cruise."

"I should strongly recommend you," said I, "to abandon all thoughts of returning home in the Lady Maud. Your wisest course will be to land your wife at Kingston, and accompany her to England in one of the mail-steamers. It is quite clear that Lady Brookes' nerves will not suffer her to receive any benefit from the sea."

"And can you be surprised?" he cried. "Feel this, now!" and, as he spoke, the yacht seemed to jump clean out of the water, reeling in her somersault until the edge of the swinging trays touched the upper deck, and I, from the port side of the cabin, looked down at Sir Mordaunt as though my head was out of a window and I was surveying a man on the pavement below. And then came one of those falls which always filled me with dread. The crash of the hull striking the water was as heart-shaking as the explosion of a great piece of ordnance, and the thunder of the near surges roared like the echo of the report. The deadly pause followed; you could have heard the foam upon the deck seething and hissing to the very doors of the companion, and presently, when the brave little vessel lifted again, my face was wet with sweat. Ay, call me what name you please, but had you sat in that stifling cabin, and felt that prodigious heave and fall and waited through that frightful pause to see if she would lift

again, you must have a stronger head and heart than I, not to have perspired at every pore as I did.

It was impossible to go on talking. Even the few sentences we had exchanged had to be shouted, so wild and mixed were the sounds in the cabin. Norie lay sick and stupefied in his bunk; he had been there since the preceding day. Miss Tuke and Mrs. Stretton were with Lady Brookes. The widow, I had heard from Sir Mordaunt, had been unremitting in her attentions and Miss Tuke had borne herself with great courage. Indeed, those two women were the real heroines of that gale; we men made but poor figures by comparison.

But to cut this part of my log short: the gale left us at noon on a day that made the third day of furious storm. The wind fined down with astonishing rapidity. It seemed, indeed, to drop completely and at once. I went on deck to look about me, and stood transfixed and absolutely awed by the appearance of the swell. The height and power of the liquid mountains pass all power of description in words. The monstrous acclivities took their color from the sky, and wore the appearance of molten lead. They poured their gigantic folds along without a break of foam to relieve the livid, heaving unnatural aspect; and such was the rolling of the yacht, that with every dip of her gunwales she seemed to lay her masts along the water, and it was as much as a man's life was worth for him to let go his hold.

Figure such a sea, without a breath of air to ruffle the gigantic oil-smooth coils! The small rise in the glass did not encourage me to believe that we were going to have it all our own way yet. Clinging to the companion, I gazed around me to see what damage the gale had done us. Forward I could trace no mischief beyond the loss of the hen-coops; but, on looking at the davits, I saw that the fine quarter-boat with which we had rescued the survivors of the bark's crew had been smashed to pieces—she was no more than a mere skeleton, the stem and stern posts hanging by the tackles. But the long boat amidships on chocks was safe, though it was strange that she should have escaped the seas which had washed over the bows.

The first to come on deck was Sir Mordaunt. He stood looking around him with the utmost astonishment.

"I can hardly credit my senses!" he exclaimed. "Why, just now it was blowing fit to tear the masts out! Is this only a lull, Walton? It may burst upon us from another quarter in a minute."

"I hope not," said I, "and I hardly think so. Once in my experience—it was in my first voyage—a gale left us as this has done, blew itself clean out, and fell dead. But I remember that it left a better sky than that," I continued, casting my eye on the sooty stooping pall, and noticing the gradual thickening up of the horizon all round.

"How frightfully the yacht rolls!" he cried. "I hope we may not swing our masts overboard. To be reduced to a sheer hulk would about complete the misery of the last three days."

"No fear of that," I answered, "with those topmasts housed and those preventer backstays set up. Is that your doing, Mr. Tripshore?" I called, pointing to those additional supports to the masts, and addressing the mate, who stood holding on to one of the belaying-pins which girdled the foot of the mainmast.

"Yes, sir," he replied; "and they're all wanted. If there was any chance of this here tumbling lasting, I don't know but what I'd recommend Mr. Purchase to swifter in the rigging. But now the wind's gone, the swell will go too."

"Are we booked for any more bad weather, think you?" asked Sir Mordaunt.

"Well, it's hard to say, sir," said the mate, throwing a look around. "It's drawing on thick; but if any wind comes, it won't come hard whilst that fog hangs."

"Where's Purchase?"

"Below, sir, working out his dead-reckoning."

"We ought to know what he makes it," said I. "We've been blown by a long slant to the westward, and if the last observation he took—four days since, mind—was correct, his course should be to the eastward until he can get sights."

"I'll speak to him," said the baronet. "Tripshore, tell Purchase to come to me the moment he has worked out his reckoning, and request him to bring his chart."

The mate went below, and presently Mrs. Stretton came up the companion. I helped her up, and gave her a rope's end to hold by. She was very pale, and seemed worn out; her eyes had lost their brilliancy, and she reminded me of the appearance she had presented on the day of her rescue.

"You are wise to come on deck," exclaimed Sir Mordaunt. "I am afraid you have suffered from your confinement below, and your devoted attention to my wife. Believe me deeply sensible of the sympathy and kindness you have shown her."

"I owe you my life," she replied, simply. "I shall never be able to repay you—nor you, Mr. Walton." And then looking at the sea, she cried: "The wind is gone, and yet in the cabin it feels sometimes as if the yacht were rolling over."

"We have seen the worst of it," said I; "though I should prefer the sunshine to that mist which is gathering around us. Is Miss Tuke coming up?"

"No; as Lady Brookes is asleep, Miss Tuke has gone to lie down," she answered. "What a brave girl she is! In the worst of the gale she never showed the least fear."

Here Tripshore came on deck.

"Will Purchase be long?" called out Sir Mordaunt.

"I don't think so, sir," answered the mate, giving me a queer look, the meaning of which I could not guess.

All this while we lay floundering and wallowing under our lower masts, with not a fragment of canvas showing. Sail was of no use to us until some wind came. An hour's idle beating and flogging upon those shooting, staggering, and swinging spars would have done our canvas more harm than three months of fair wear. The schooner lay broadside to the swell, that now and again depressed her so sharply that the green water poured over the bulwark rail on to the deck, and went washing as high as a man's knees over to the other side with the send of the vessel; and the jerking and straining of the masts were so violent that it would not have greatly surprised me had the chain-plates drawn, and the lofty sticks gone away overboard.

About twenty minutes after Sir Mordaunt had sent for him, Purchase emerged, and came clawing and lurching along to where we stood. He had a chart under his arm, and a sheet of paper in one hand. His face was unusually red, his cap was drawn low down over his forehead, and fake upon fake of blue spotted neckcloth coiled round his neck gave him such a strangled look as was disagreeable to see.

"Purchase," said Sir Mordaunt, "I am anxious to know what you make our position. We must have been driven a good many knots to the westward, and the weather looks very ugly—very ugly yet, Purchase. No sign of the sun, and no promise of a star to-night;" and he stared upward and then around him with a dismal shake of the head.

The old man made no answer to this, but leaning against the skylight so as to balance himself, he opened the chart.

"Here, Mr. Tripshore," he exclaimed, in somewhat thick accents, "come and put your hand upon this chart where it curls up."

This was done, and Sir Mordaunt drew near the skipper, holding tightly by the skylight. I stood on the other side, but the chart was intelligible to me though inverted. Likewise I had a good view of Purchase, who, the moment I looked at him close, I could

see had been drinking. Sir Mordaunt found this out also at once, no doubt by the smell of the man's breath (for he stood next him). He drew up suddenly and stared at him, and then glanced at me, but said nothing.

"Here's the place where I makes the yacht to be," said Purchase, pressing his square thumb upon the chart. "Ye can read the latitood and longitood," he aded, speaking in a greasy, ventral, low-comedian sort of voice, and surveying me with his small wandering eyes.

"What do you make it?" demanded Sir Mordaunt, with a sternness I had never seen in him before, nor should have believed possible in him.

The old fellow raised the sheet of paper to his face, and after bothering over the figures, answered, "Latitood, twenty-five degrees ten minutes; longitood, seventy-three degrees five minutes."

"What drift have you allowed for the three days?" I inquired.

He made no reply.

"Don't you hear Mr. Walton's question?" cried Sir Mordaunt.

"I've got northen to do with Mr. Walton, sir," he answered. "You're my master."

The baronet repeated my question.

"About thirty mile," he answered, keeping his thumb stuck upon the chart in the queerest posture, as though he wanted to spin his hand.

"You may add another sixty miles to that, Sir Mordaunt, and then be within the mark," said I.

The old skipper looked at me with wandering eyes and most evil expression in his face. I waited for him to insult me, when I should have told him he was drunk, and talked to him as I should have known how from my old sea training; but he held his peace, perhaps because he saw my intention.

"Here I see is the Crooked Island Passage," said Sir Mordaunt, after pausing to give Purchase time to answer my objection.

"Bearing south-by-west, half west," said Purchase. "'Taint my idee to try for that passage, sir. I shall haul away to the eastard under heavy canvas till the weather clears."

"That's just what you suggested, Walton," said Sir Mordaunt, with a gleam of satisfaction on his face.

Purchase looked at me, and was about to speak, but the yacht dipping heavily, he gave with it, lost his balance, and went rolling like a barrel down against the bulwarks. This was an accident that might easily have befallen him even had he been perfectly sober; but as we all perceived he was partially intoxicated, his tumble was like an emphasis upon his condition, and Sir Mordaunt looked away with an air of great disgust and irritation from the square scrambling figure, as the old noodle got up and lurched toward the skylight, with a purple face shining with perspiration.

"That will do," said the baronet to Purchase. "You can take the chart below again."

"That's what I makes it, sir," replied the man, again reading the sheet of paper, and trying to steady his voice and comport himself as though he would have us see his fall was no evidence of unsteady legs. "Latitood, twenty-five ten; longitood, seventy-three five." And so saying, he rolled up the chart very slowly, and deliberately took a prolonged view of the sea, and watching his chance, sheered over to the starboard bulwarks, and clawed himself abreast of the hatchway, down which he disappeared.

Sir Mordaunt stood near me in moody silence, until Mrs. Stretton, who grew fatigued by her posture, asked me to hand her to the companion. I assisted her to descend the steps, and then returned.

"I am afraid you are right in your views of Purchase," said Sir Mordaunt. "He is again in liquor, and I fear the habit is confirmed. Three times we have detected him, and who knows how often he may have been intoxicated in the night-time, when we were asleep? I am greatly decieved and disappointed. I could not have believed he would misbehave again after the conversation I had with him. But I shall say nothing to him. Let him carry the yacht to Kingston, which I have no doubt he'll be able to manage, and I will hand the vessel over to some agents to send to England. We have all had enough of this cruise. For myself, I can honestly say the last week has cured me of my taste for ocean sailing. Henceforth—if I am spared for any more yachting—I shall never go a mile beyond English waters.

"Well, as you say, the man has navigated us so far, and he may be able to accomplish the rest; and perhaps you are wise in resolving to say nothing to him," said I. "But he is out in his dead-reckoning—of that I am positive; though, as he means to stand to the eastward, his miscalculations ought not to greatly matter."

"When should we make Jamaica, think you?"

"In about ten days or so, with anything of a breeze," I answered. "I am assuming, of course, that Purchase's latitude is correct. His longitude I am sure is wrong."

"After his conduct to-day I shall stand no more on ceremony," said he. "I'll not consult the fellow's feelings. If you will take an observation—of course, if a chance occurs," casting a forlorn look at the sky—" you'll greatly oblige me."

"I can take a star in his watch below. He needn't know that I am topping him."

"Why didn't you suggest that before?" asked he, reproachfully.

"Pray remember how sensitive you have been about the man. You staved off all criticism."

"Because I had confidence. And mind, Walton, I am only shaken now because he has broken his promise, and I find him drunk again. But you will do as you suggest? It will ease both our minds to know that his reckoning tallies with ours. And though he should have underestimated our drift to the west, that will not make his observations incorrect."

"Certainly not," said I. "But look there—and there! We shall get no stars to-night. The horizon's not a mile off; and did mortal man ever see the water so hideously ugly a color before?"

The thick mist that had been slowly gathering round, coming up from every point of the compass, had made the visible sea a mere narrow circle of water, which every moment was growing smaller and smaller. The swell, however, was fast falling, though it was still ponderous enough in all conscience; and, owing to the diminished compass of the deep, had a more formidable appearance than it wore even when at its worst, owing to the majestic waving of the near horizon. The decks were full of currents of air, caused by the wallowing of the schooner, but there was no wind on the sea. The folds of the swell were as polished as glass. Yet the creeping girdle of mist, and the violent panting of the ocean, and malignant, sallow, bluish tint of the water as though it was putrefied, and the lowering lead of the sullen, motionless sky over our staggering masts, filled the mind with a spirit of foreboding miserable to feel and impossible to express.

When the lunch hour arrived I followed Sir Mordaunt into the cabin, where we found Miss Tuke and Mrs. Stretton. Before taking his seat, Sir Mordaunt went to his wife's berth, and then returned, accompanied by Norie, who, although greatly nauseated by the detestable rolling, was making a manful fight with it. He had been in attendance on Lady Brookes for the greater part of the morning. This was the first time I had seen him for many hours, and we shook hands like people meeting after a long absence.

I found that Mrs. Stretton was to lunch with us, which I attributed to Miss Tuke's invitation. But now that she was constantly with Lady Brookes, there was no reason why she should not make one of our party, and drop her furtive life in Carey's

cabin, and her secret meals with that lady's-maid. I was heartily pleased to see her among us. I had all along felt that Norie's banishment of her, merely because Lady Brookes might take fright at any reference to the horrors of the time spent upon the water-logged bark, was cruel usage to give to the poor shipwrecked woman, whose sex and loneliness, and the dreadful sufferings she had endured, gave her a powerful claim upon our tenderness."

"Do you think we shall have any more stormy weather, Mr. Walton?" asked Miss Tuke.

I answered that it would be very unusual if we met with another gale, as this was not hurricane month. "The air," said I, "is very thick, but a little wind may scatter that, and expose the blue sky again, which I for one shall be glad to see."

"The motion of the yacht is much less violent than it was," said Sir Mordaunt.

"The swell goes down fast, thank Heaven."

"Walton," cried Norie, "you do not catch me coming to sea again. An old sailor once said to me, 'Master, a square foot of dry land is better than an acre of shipboard.' And often did that observation rise in my mind whilst I was praying in the gale, and wondering how long a stout young fellow like me would take to drown."

"If your fright was so great, I wonder your hair preserved its color," said Miss Tuke.

"My fright was very great; I don't deny it. Several times I thought we had upset," he answered.

"That's an honest admission for our friend to make in the face of such courage as you and Mrs. Stretton showed," said I to Miss Tuke.

"The bravery was Mrs. Stretton's," she answered. "Had she not encouraged me, I should have been as frightened as Mr. Norie."

"The fog must be upon us," said the baronet. "How uncommonly dark the cabin has become!"

"Hark! What are they doing on deck?" cried Norie, whose nerves were in a condition to be easily alarmed.

"Making sail," I answered, hearing the tramp of feet and the sounds of coils of running gear flung down. "There is a breeze coming, or arrived."

In a few moments the vessel heeled over to starboard—sure evidence that canvas was on her and that wind was blowing. The inclination greatly steadied her, and there was a sensation of buoyancy in her movements as she swung over the swell.

"Can you read that tell-tale over your head, Sir Mordaunt?" I called out.

He stood up and looked at the compass with a pair of glasses that dangled on his waistcoat. The gloom was so deep that he had some difficulty to decipher the points. After a little he said:

"We are heading south-east by east."

I reflected, and said:

"That is not our course. Tripshore should be advised not to make any southing. We have a whole nest of islands under our lee."

He interrupted me.

"Let us go on deck, Walton, and see what they are about."

I threw down my knife and fork, and ran for my hat. Had it not been for the tepid temperature, emerging through the companion into the open air would have been like shooting into a London November day. The mist was as thick as smoke, grayish rather than white, owing to the sun being buried; and had you flung a biscuit over the yacht's side it would have disappeared before it touched the water, so short was the span of visible sea from the yacht to the concealing folds of vapor. The mist was like a driving rain, and the decks were dark with the saturation of it. The breeze was sweeping the vapor in masses along with it, and whitening the near water with streaks and glancings of foam. The yacht was close-hauled. They had set the double-reefed mainsail and standing and outer jibs, and this canvas was as flat as pancakes under the tautly bowsed sheets. Indeed, our main boom was very nearly amidships. The send of the head swell stopped the schooner's way, and she was jammed too close to the wind to take much propulsion from the canvas that was stretched like drumskins fore and aft her. I was bitterly vexed to find the wind sticking in the east. Tripshore came up to us the moment we appeared.

"Do you think you are wise in making any southing?" I asked him.

"Why sir," he answered, "if Mr. Purchase's reckoning is right, we have plenty of sea-room with our head at this."

"But Mr. Walton is persuaded that we are farther to the westward than Purchase allows," said Sir Mordaunt.

"Give the matter a moment's consideration, Tripshore," said I. "Will you agree with Purchase that our drift during the gale was only thirty miles?"

"I'm agreeable to double that, sir," he answered. "But even then there's nothing in the way, heading as we go."

"Fetch the chart," exclaimed Sir Mordaunt. "There's only one road to be taken, and that's the right one."

The man quitted the deck, and I walked aft, to see what leeway we were making. The wake was short, broad, and oily, and veered away on our weather quarter. With my hand upon the compass card, I made it about two points. This was as much leeway as one would look for in a ship under close-reefed topsails. It did not surprise me, however. I knew, under certain conditions, that few schooners could hold their own on a wind better than the Lady Maud, but the luff choked her. She was under small canvas, and looking, as she was, almost right in the wind's eye, it was wonderful that she made any headway at all.

To save this leeway, I thought it would be advisable to ease off the sheets a trifle; but the responsibility of making any suggestion in the midst of weather as thick as mud, and in the face of my complete doubts of Purchase's accuracy as to the position he affirmed us to be in, weighed down my anxiety, and determined me to hold my peace for the present.

After a brief absence, Tripshore returned with the chart. He laid it upon the skylight, and we bent over it.

"You see, sir," said the mate to me, "if Mr. Purchase be out even by three times the drift he allows for, this here course of south-east by east heads us well into the open, away from that there raffle," indicating the Bahama group to the south of Providence Channel.

"But suppose our longitude should be to the west of 74 degrees?" said I. "Go and look over the stern, and mark the leeway, and then take notice of this island," pointing to the island of San Salvador.

"Ay, Walton," exclaimed Sir Mordaunt, "but why do you want to give us so much west longitude? Allowing that Purchase is out as far as you say, you don't believe that he is farther out still?"

"I don't know," said I. "I have no faith in his calculations. Who can swear that his latitude is right?"

Sir Mordaunt peered at the chart, and then said:

"What do you propose, Walton?"

"Since you ask me plump," I answered, "I should like to see the yacht on the starboard tack."

"That 'ud be running away from where you want to go to, sir, wouldn't it?" said Tripshore, smiling.

"We certainly don't want to do that," cried Sir Mordaunt, quickly. "We must get to Kingston as soon as ever we can."

(Continued on page 354.)

A New Class R Boat for the Great Lakes

THE coming season promises to be an interesting one on the Great Lakes as far as racing is concerned, and particularly in Class R boats. Several valuable trophies have been offered for inter-Club races with boats of this class, and a number of new craft will be on hand to compete for them.

With the courtesy of Messrs. Cox & Stevens, of this city, we are publishing herewith plans of a Class R boat from their designs which is being built by a syndicate composed of members of the Lakewood Yacht Club, on Lake Erie, this club being one of those most actively interested in the class on the Lakes and having among its members many enthusiastic racing men.

As the Interlake Yachting Association has recently adopted the Universal Rule of measurement, with a slight modification making allowance for centerboard boats racing against keel vessels, it is probable that the coming races will be unusually interesting, as without doubt there will be several distinct types of boats competing.

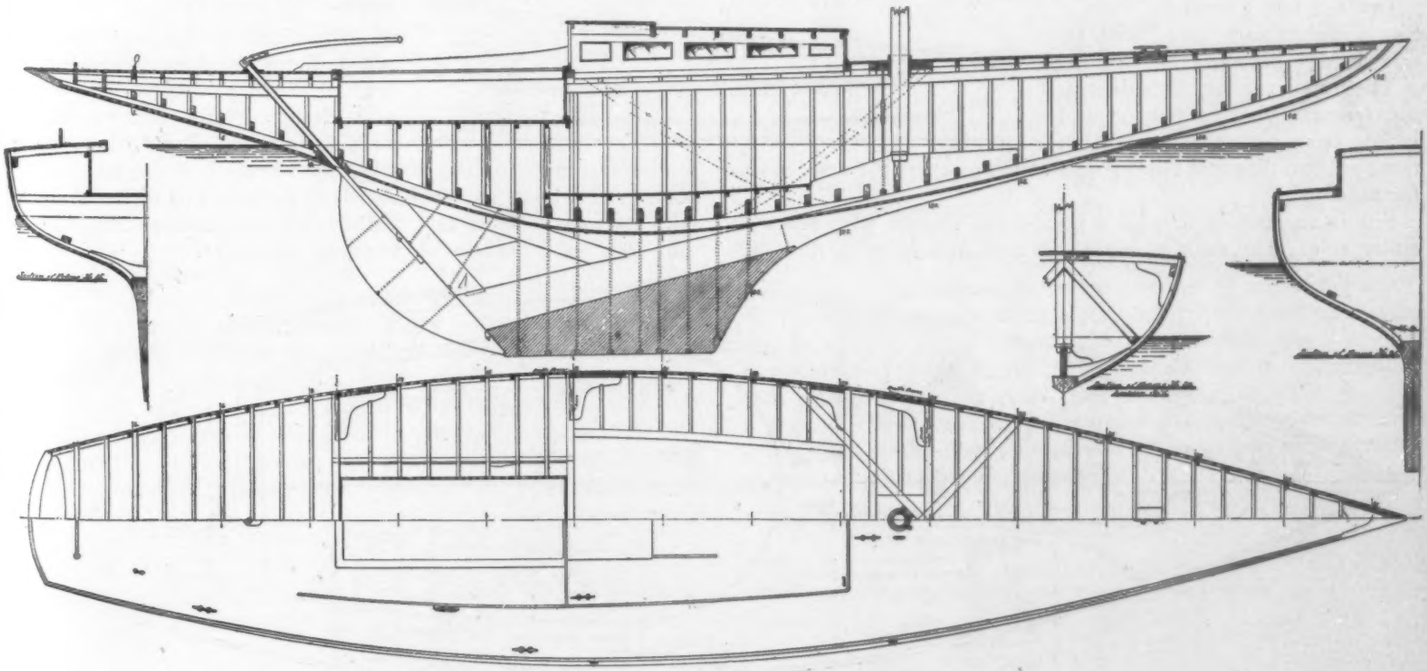
In this craft Messrs. Cox & Stevens have turned out a keel boat, the approximate dimensions being: Length over all, 34 feet 6 inches; waterline, 21 feet 6 inches; beam, 7 feet 9 inches; draft, 5 feet 2 inches; sail area, 565 square feet. In getting up this design the architects have studied carefully the existing conditions where the races are to be held, and, on account of the varied weather to be experienced in those waters, have developed a boat that is not extreme in any one particular and one that should give a good account of herself under all conditions.

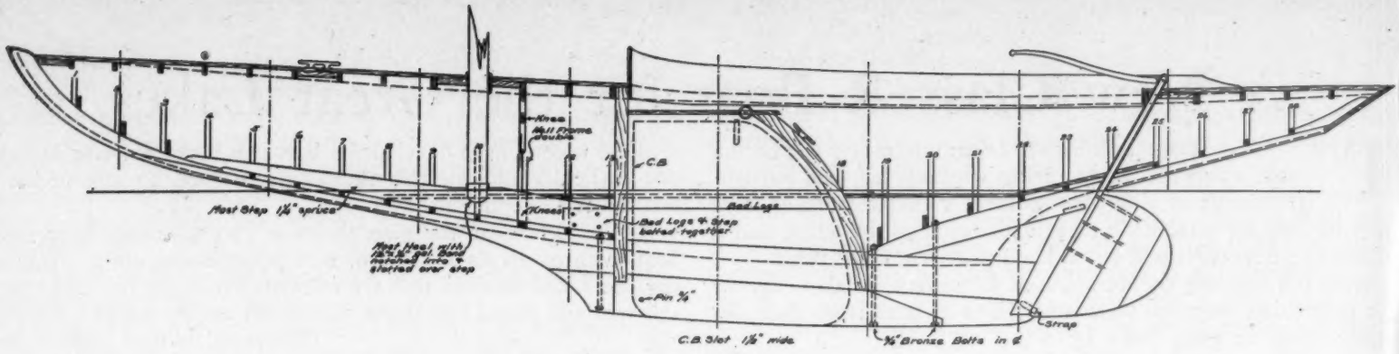
An inspection of the plan shows a very pleasing, attractive boat, with moderate freeboard, well proportioned ends, a pleasing sheer, and sections that are calculated to make her carry her sail well and travel fast under almost any conditions of weather.

This vessel is now well under construction in a local yard in the neighborhood of Lakewood, and her spars, sails and fittings are all being turned out by the most expert concerns in the several branches. No expense is being spared in the construction of this vessel, which is being carried on under the superintendence of the designers. She has a trunk cabin with glass sides, commonly seen in all the new sailing yachts, and offers good accommodations for her crew.

The construction, while light, is very substantial, and the boat ought to stand a lot of driving. The sail plan is particularly good, and she should be an easy boat to handle. The forward overhang is fairly long, the forestay coming down to the stem head, as in most of the Q and P class boats of the present day.

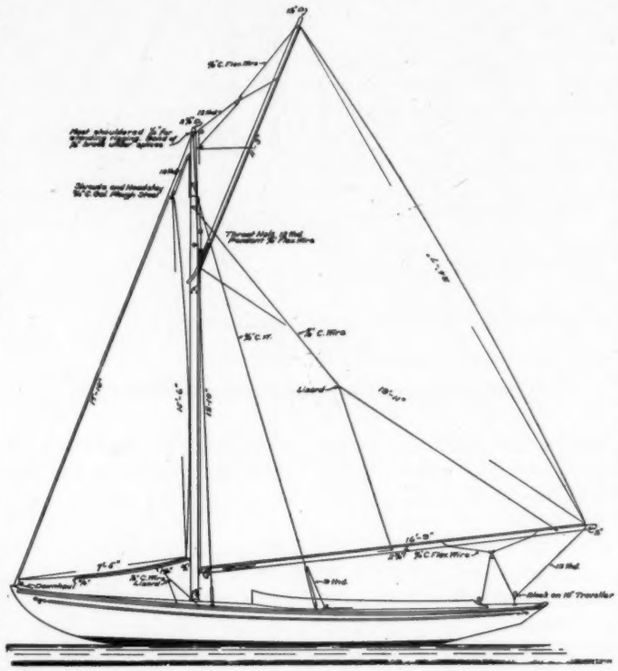
It would be a good thing if more boats of this class were built for Eastern waters, as the R class seldom fills in the Sound regattas. They are a particularly good size, and are not too large for a small crew to handle.





A 23-Foot Special-Class Knockabout

IT is getting to be quite a common thing for the yachtsmen of Northern Europe to have their racing craft designed in this country, and the accompanying plans of a little 23-foot, special-class racer designed for Mr. Victor Favre, of Wiborg, Finland, is the latest one of a number of boats designed during the past few years by Mr. William H. Hand, Jr., of New Bedford, Massachusetts, for use in those waters.



This interesting little boat was built under a special rating rule in use in that country, and will be raced in the vicinity of Wiborg this summer in competition with other boats built to the same rule. While a centerboard boat, she is not flat, having a good body and 800 pounds of lead in her keel, through a slot in which the centerboard works.

The principal dimensions are:

Length over all, 23 feet 1½ inches;

Length waterline, 14 feet;

Extreme beam, 6 feet 7½ inches;

Draft, 2 feet 3 inches.

She is knockabout-rigged, with forestay leading down to the stem head.

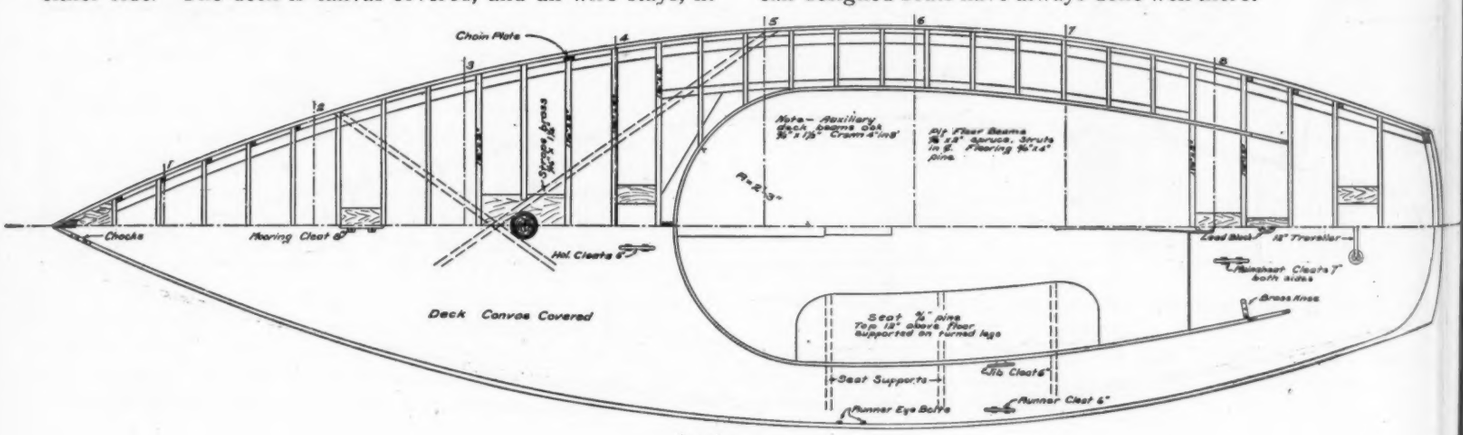
The construction is substantial, the frames being of oak, spaced 9 inches from center to center, while there are two diagonal brass straps running across the deck beams forward.

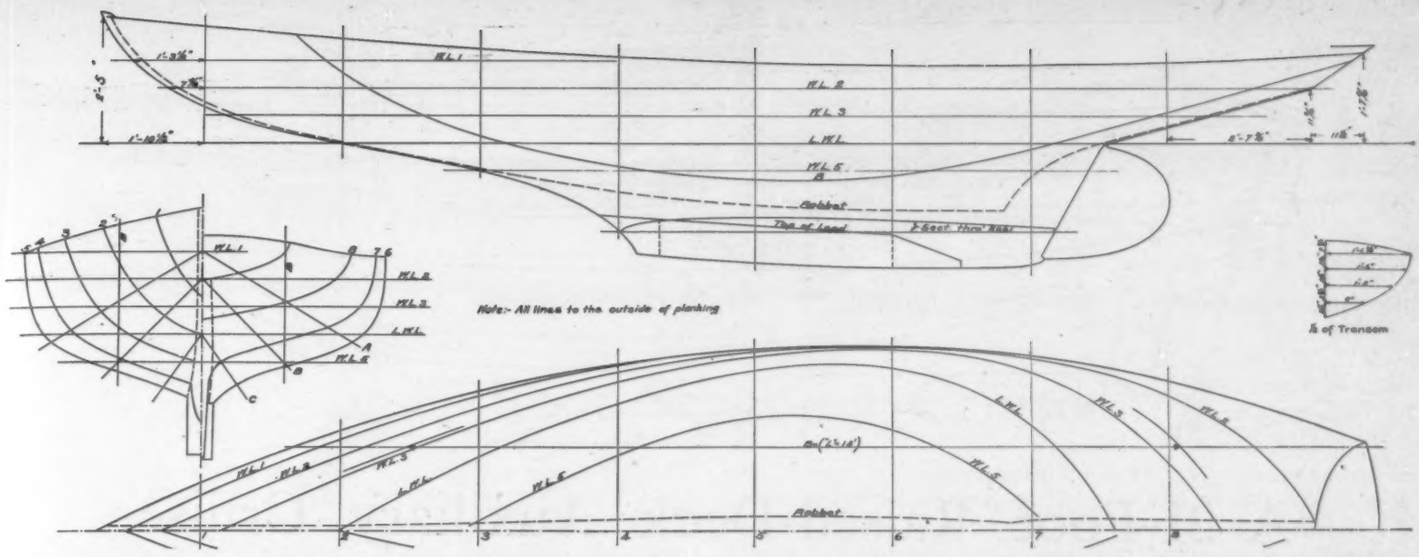
She is an open boat, with a good-sized cockpit with seats on either side. The deck is canvas-covered, and all wire stays, fittings, etc., are of the best materials. The lines show a very clean, wholesome little craft, well adapted for afternoon sailing and class racing, and the design should make an excellent one-design class for clubs where the depth of water prevents the use of a keel boat. The overhangs are shapely and not excessive, and the sail area is moderate.

The craft is made non-sinkable by the use of watertight bulkheads. The plans herewith show the general arrangement and construction very fully.

The centerboard, while amply deep, is rather narrow, and, for this reason, takes up very little of the available room in the cockpit.

It may be surprising to American yachtsmen to learn that there is considerable activity in yacht racing in Finland, Helsingfors and Wiborg being the principal centers, and a great number of modern boats are to be found in these waters, most of them being for the smaller classes. While a number of these craft are of American design, as already noted, there are also quite a number of British design, and several designed and built by local Finnish firms. For this reason the interest in racing has always been keen. It is one of the few places where boats from the boards of designers of different countries are raced consistently, and it is pleasing to note that American-designed boats have always done well there.

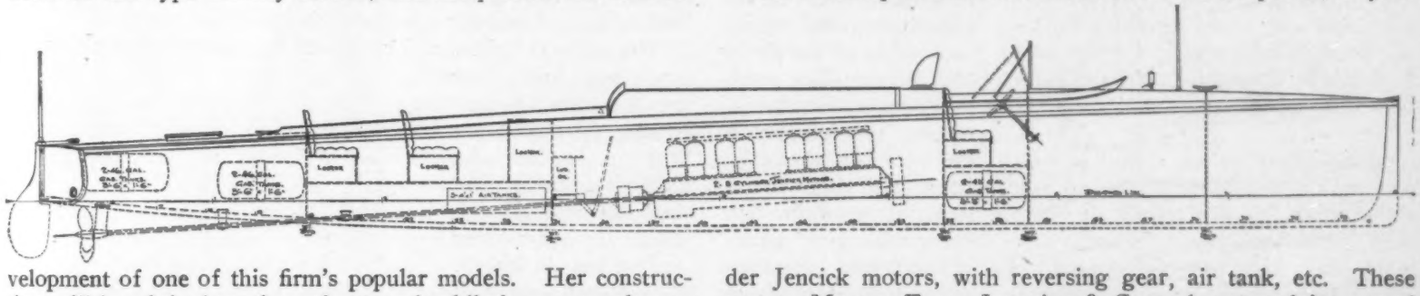




Mr. Hand, the designer of this boat, is well known as the designer of the V-bottomed type of motor boats, both cruiser and speed launches, and has done much to make this particular type popular.

A 55-Foot High-Speed Motor Launch

THERE is now building by the George Lawley & Son, Corporation, Neponset, Mass., from designs by Messrs. Tams, Lemoine & Crane, and under their supervision, a 55-foot, high-speed motor launch, the plans of which are shown here. There is a fast growing demand for large high-speed boats of this type for day service, and the present one is a development of one of this firm's popular models. Her construction will be of the best throughout, and, while in no sense heavy, is most substantial.



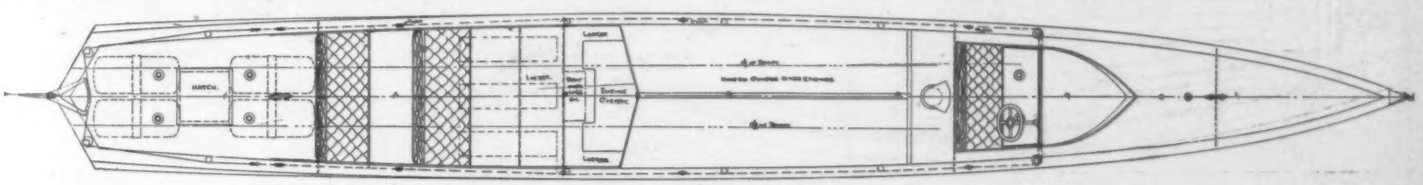
Her general dimensions are: 55 feet over all, 6 feet 10 inches beam, 4 feet 3 inches deep. Her keel will be of yellow pine in one length; the stem of oak, crooked in one piece; frames of elm, steam-bent, in one piece from keel to deck. The planking will be of mahogany, copper-fastened, and deck of mahogany. The motor foundations are to be of elm, and extra heavy. She will have a turtle deck forward, with a watertight bulkhead in bow. There will be three cockpits, with mahogany coamings.

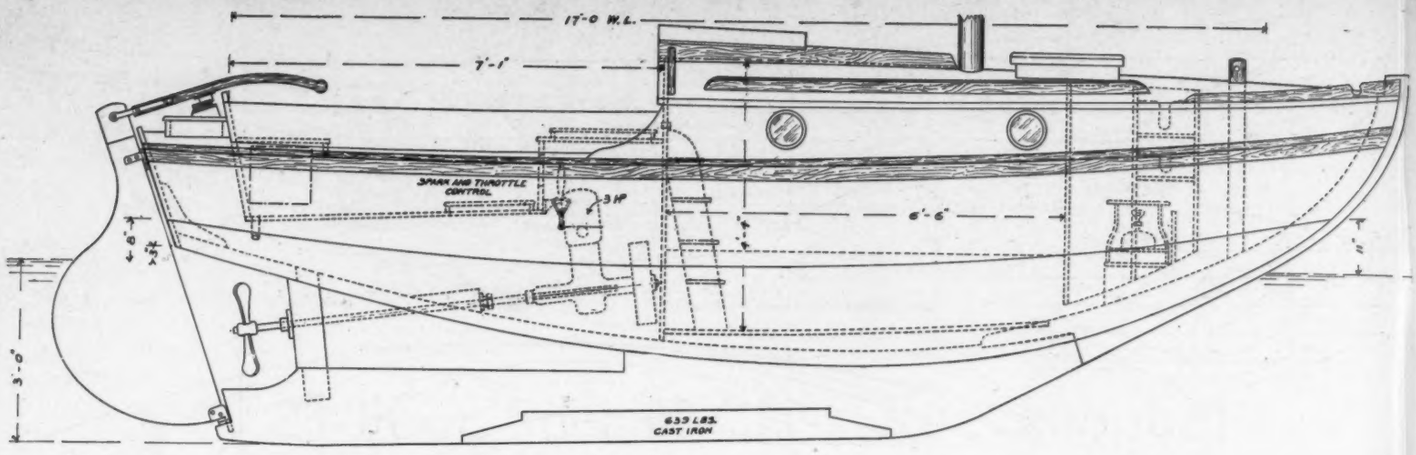
In the after, or owner's, cockpit there will be two athwartship seats, with lockers underneath. There will be a storm hood over this cockpit, with a mahogany wind shield with glass windows, which will furnish ample protection for the owner in stormy weather. Forward of this is the engineer's cockpit, with seat and lockers on each side, at the after end of the engine space. Directly forward of this engine space is the steersman's cockpit, which also has an athwartship seat, with locker underneath. This cockpit is fitted with a hinged wind shield. The launch is to have two steering wheels, one in the owner's cockpit and one in the steersman's cockpit on the starboard side. She will also be fitted with five watertight bulkheads.

Her motive power will consist of two 200 horsepower, 8-cylinder Jencick motors, with reversing gear, air tank, etc. These motors Messrs. Tams, Lemoine & Crane have used in several high-speed motor boats of their design and have found them to be excellent for this type of boat. The gasolene tanks are to be of seamless tinned steel with a capacity of 270 gallons; they will be six in number—four in the after part of the launch and two under the forward cockpit. The gasolene supply pipes will be of copper. Practically all metal work on deck will be of brass. Her propellers are being especially designed by Mr. Crane, the shafting being of Tobin bronze, while she will have a Monel plate rudder. She is designed to have a speed of 35 miles an hour.

This boat is being built for a prominent New York yachtsman, who now owns a fast launch which was built a few years ago from Messrs. Tams, Lemoine & Crane's design. She will be used principally at Islesboro, Me.

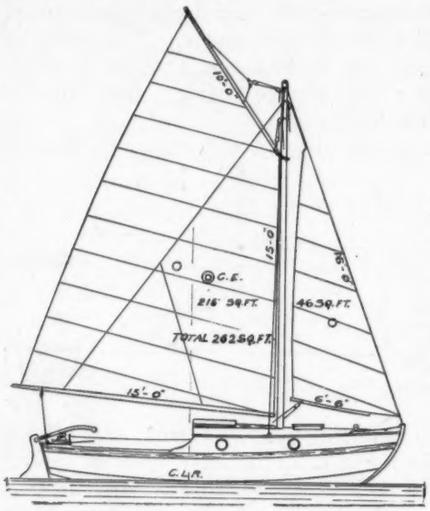
Messrs. Tams, Lemoine & Crane now have under construction several fast racing boats, which will no doubt give good accounts of themselves this coming season.





A 21-Foot Raised-Deck Auxiliary Cruiser

THE designs of Mr. C. H. Dodd, of Boston, who has made a specialty of the V-bottomed type of auxiliary cruiser, are already well known to the readers of YACHTING, a number of boats having been built from plans of this type that we have published and described at various times.

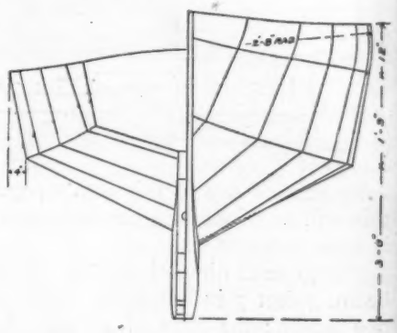


The drawings which we publish herewith are of one of Mr. Dodd's latest boats, and vary somewhat from the previous ones, owing to the fact that in them he has embodied the raised-deck cabin of the power boat in a 21-foot auxiliary knockabout, thereby adding considerably to the room in the cabin and simplifying her construction somewhat over the trunk-cabin type.

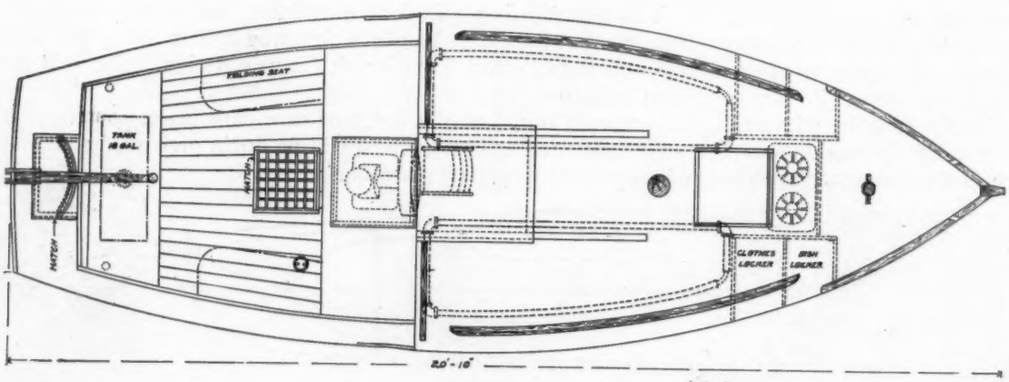
This boat measures 21 feet in length over all, 17 feet on the waterline, 7 feet extreme beam, 6 feet 4 inches beam at waterline, with a draft of 3 feet. She is sharp forward, with no reverse curve, and has a long keel, in which is carried 639 pounds of cast iron as ballast. She has a small bridge deck amidships, under which is located a 3-horsepower, single-cylinder motor turning a two-bladed propeller, this arrangement keeping the engine entirely out of the cabin, and, at the same time, out of the way in the cockpit, as the bridge deck, with a hatch over the engine, adds to the seating capacity of the boat. There is a hatch with a grating in the cockpit floor just aft of the engine, allowing proper ventilation. The cockpit is 7 feet 1 inch long, with a seat across the after end and on either side.

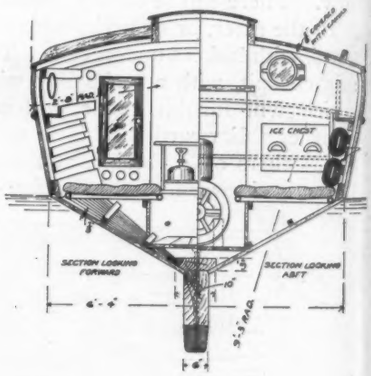
The cabin itself is 6 feet 6 inches long between the after bulkhead and the bulkhead for the clothes lockers at the forward end, and has a transom on either side, providing sleeping accommodations. Forward of the clothes lockers is space for a two-burner stove, with ample dish lockers and facilities for storing provisions. There is 4 feet 4 inches of headroom, which, while limited, is a good deal for a boat of this size.

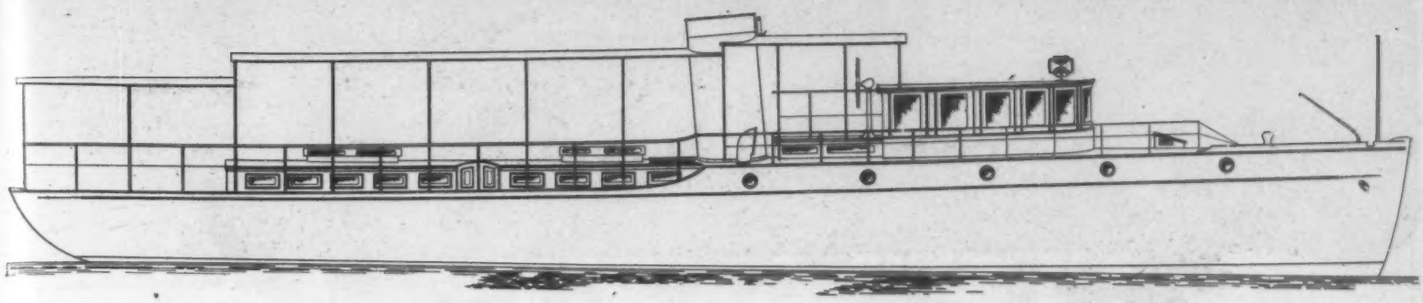
The cabin is lighted and ventilated by two ports on either side and a large hatch forward of the mast, over the stove. The boat carries 262 square feet of sail, 216 feet being in the mainsail and 46 feet in the jib, the main boom being 15 feet in length.



A V-bottomed boat of this type is of very simple construction, being easily built by an amateur, as there is little bending and fitting of planks. The cost of building her in good manner, with sails, a 3 or 3½-horsepower motor, complete and ready for sea, with the exception of cabin fittings, should not exceed $425 or $450.







An 80-Foot Seagoing Cruiser

THE accompanying plans are of an 80-foot cruiser designed for use on the St. Lawrence River, Lake Ontario, Gulf of St. Lawrence and the Atlantic Coast by the Stearns & McKay Company, of Marblehead, Mass., and show the latest production of this type of craft by this well-known firm.

In placing the order the requirements of the owner called for a powerful seagoing cruiser and one which would at the same time be thoroughly satisfactory on the more sheltered waters of the St. Lawrence River, the boat being for a Canadian yachtsman.

The general dimensions of the boat are:

Length over all, 80 feet;
Length waterline, 74 feet;
Extreme beam, 14 feet 6 inches;
Extreme draft, 4 feet 6 inches.

The plans show a very powerful boat, with ample freeboard for off-shore cruising and rough water. She has a flush raised deck forward extending for nearly one-half the length of the yacht, while a large pilot house insures ample protection in wet or heavy weather. Immediately aft of the pilot house is a raised platform or bridge where an additional steering gear is located, allowing the boat to be handled from this point as well as from the pilot house. This bridge is covered by an awning, as is the entire after part of the vessel, the stanchions being so arranged that they may be unshipped and stowed away below decks, occupying but small space.

From the break of the raised deck a trunk cabin extends, with oblong plate-glass windows, these and two large skylights giving ample light and ventilation below. The interior of the yacht was worked out to give the maximum comfort for cruising. There is a large main cabin aft under this raised cabin trunk, which may be entered directly from the cockpit by a companionway. This cabin is 10 feet long by 10 feet wide and makes a very pleasant lounging room, there being transoms on either side which may be made into berths at night, a dresser, lockers, etc. There is also another companionway opening from the starboard alleyway and leading below into a passage connecting the main cabin and the two staterooms forward. Along this passageway, opposite the stairs, is a large bathroom, with full-sized bathtub and the usual fittings, while alongside the stairs is a large hanging locker.

The owner's stateroom, on the port side, is particularly commodious, and makes a very comfortable living room, there being a large built-in berth, bureau, seat and clothes locker. The starboard stateroom also has a large berth, clothes locker and seat.

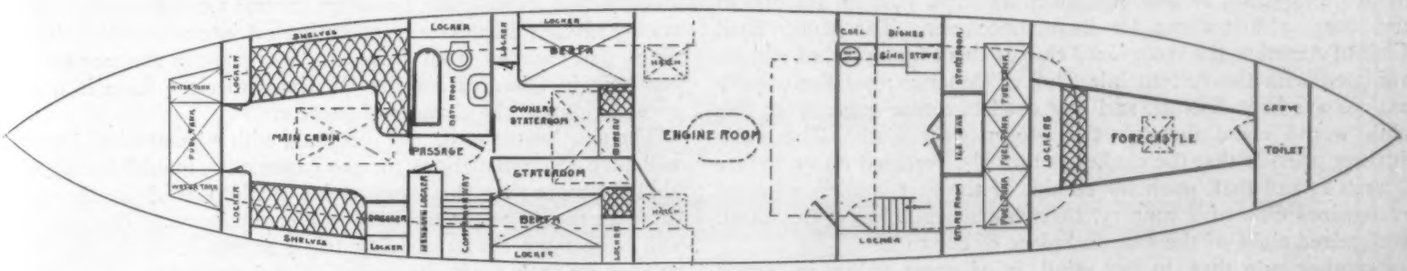
The arrangement is particularly well laid out for those occasions when there are ladies in the party, as access may be had to the staterooms without having to go through the main cabin. Forward of the two staterooms is a watertight bulkhead separating the engine room and crew's quarters from the owner's quarters. There will, however, be a sliding door in this bulkhead, allowing access to the galley, forward, in heavy weather without the necessity of going on deck.

The engine room is 11 feet 6 inches long, large enough to prevent any crowding, and is not encumbered with tanks of any kind. The yacht will be powered with a 90 horsepower, triple-expansion steam engine, with oil-burning boilers, the fuel being carried in tanks forward of the galley and aft under the quarter-deck. This is the second outfit of the kind that the Stearns & McKay Company have used for vessels intended for Canadian waters.

Forward of the engine room is a large galley, ventilated by a raised hatch or trunk overhead under the navigating bridge. In this room are a stove, sink, hot-water boiler and dish racks, while there are plenty of lockers for storerooms and for holding dunnage, etc., every provision being made here for good, clean cooking being done in a comfortable manner. A stairway leads from the galley into one corner of the pilot house above.

Forward of this compartment are the storerooms, ice box and fuel tanks between two bulkheads, while beyond these bulkheads is the forecastle, which is entered by a booby hatch from the forward deck. There is a crew's toilet room in the extreme bow of the boat.

The yacht was designed particularly for a comfortable, seaworthy craft with fair speed, and one that would give the greatest amount of comfort to a good-sized party on extended cruising. There are comfortable accommodations for ten people, exclusive of the crew. The boat will be lighted by electricity, and will have the usual engine-room equipment and accessories.



EDITORIAL

Published by the Yachting Publishing Co.; Oswald Garrison Villard, President; Herbert L. Stone, Secretary and Treasurer

Analysis of the New British International Trophy Rules.

The new rules for the British International Trophy, formulated by the committee having charge of the matter, were received too late for a comprehensive review of them in last month's issue; but, after reading them over carefully, one is now able to form an opinion of them as a whole.

In the first place, the rules seem to be drafted in a very broad-minded manner, and it is particularly gratifying to note the liberal view of the trustees, the Royal Motor Yacht Club, in throwing the event open to an entry from any recognized yacht club; any yacht club being also eligible to challenge for the trophy. It is, of course, essential to have a recognized club in each country through which negotiations must be carried on; but this does not affect the right of any recognized club to enter a boat under its own colors and to either defend or challenge for the cup, provided the boat proves fast enough. In the event of this boat's winning, the club whose burgee she flew retains custody of the cup for one year, or until the date of the next race.

The rules also provide that, in the event of more than three boats entering, the recognized club of each country shall hold an elimination race to choose the three fastest boats. It seems wise that the details of handling the contest should be left in the hands of the recognized club of the country holding the cup, owing to the fact that, in an event of this importance, it is fitting that a club should be financially able to carry out the programme in a way befitting the value of the trophy; for it is conceivable that otherwise the trophy might be won by a recognized club, which not only had no course of its own suitable for holding the event, but which was not in a position, financially, to conduct the races. It is also obvious that there should be an unbiassed authority in every country to take charge of the preliminary races and choose the team representing the country. As the rules limit the entries to three boats for each country, the inevitable result of a trial race run under any other conditions is very apparent. This applies not only to the defense of the cup, but also to challenges for the cup in the event of more than three clubs challenging, in which case the fastest team, as indicated by the trial races, will be chosen.

Regarding the character of the clubs eligible to challenge or defend, Rule II says: "Any properly constituted motor yacht club, motor boat club, yacht club or automobile club shall be entitled to challenge for the trophy or enter a boat for its defense." Why automobile clubs should be admitted seems hard to guess, as in this country automobile clubs, as such, take no interest in the sport or do nothing for its advancement. The Motor Boat Club of America, the recognized club of this country, is, of course, affiliated with the Automobile Club of America; but the organizations are kept distinct, and any challenge that came from this club would come through the Motor Boat Club. The rules further provide that the challenge must be received on or before March 1, and that, upon the receipt of the first challenge by the recognized club of a country, that club should give notice to all recognized clubs of the date and place of the race.

Another rule that, to our mind, is of great value, in that it tends to prevent the entering of freak boats designed only for the most advantageous conditions, is that which says that "every boat on the team representing any country must start in every race before the winning boat completes the course, and must finish the course within three hours of the finish of the winning boat. Any boat failing to do this will be ineligible to start in any succeeding race."

The committee was also wise in not increasing the maximum size of the boats. While in a race of this kind practically all restrictions should be eliminated, yet the adoption of the smaller class will undoubtedly see more boats built and more races for this trophy than if the limit had been fixed at 50 feet. Probably the most important provision, however, of the new rules is that which says, "At least two races shall be won by one country to take the trophy, instead of one, as heretofore, and that racing shall be continued until one country has won two such races." In the event of two boats of the same country, but belonging to different clubs, each winning a race, the recognized club of the country shall hold a further race between these two boats to decide which is to have the custody of the trophy.

The influence of the aeroplane is apparent under the deed of gift, which states that the propelling mechanism of the boats must work solely in the water and not in the air.

The Internal-Combustion Engine in the Trans-Atlantic Trade.

A few years ago, when steam turbines were attracting so much attention by their adoption for trans-Atlantic steamships, if the prediction had been made that, inside of three years, internal-combustion engines would be used as a means of propulsion in the larger steamships in this particular trade, it would have been scouted as the chimera of an unsound mind; but the intervening three years have seen tremendous strides in gas-engine design and manufacture, and the news that now comes from England that an 11,000-ton trans-Atlantic passenger and freight steamship is being built there whose power will consist entirely of internal-combustion engines developing 7,000 horsepower does not cause any adverse comment on the experiment, if such it may be called.

In this country experiments along this line have not gone very far, 500 horsepower being about the limit of a single internal-combustion engine, while for commercial boats their size will probably average considerably under 200 horsepower. A four-masted schooner has been tried with 500 horsepower, but has not proved much of a success, owing, doubtless, to the fact that the power was probably insufficient for the size and of the difficulty of installation. In England, however, several 1,000-ton cargo steamers are already successfully operating on internal-combustion engines, and the step from these to the 11,000-ton steamer now being built in Glasgow for the Russian-American Line is not too great to imperil the chances of success.

The new boat is to be 475 feet long, with a beam of 56 feet, and will have accommodations for 400 passengers, in addition to cargo holds of more than the average size, made possible by the saving of space in the engine and boiler compartments. The new boat will have three shafts, driving triple screws, two engines being coupled on each shaft, the power of each engine being something in excess of 1,000 horsepower.

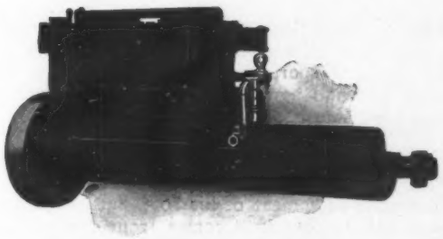
BUFFALO MARINE ENGINES

One, Two, Four, Six and Eight Cylinders
Regular—Heavy Duty—High Speed
2 to 225 Horsepower.

RELIABILITY, economy and simplicity of operation. These are the points to be considered when "fitting-out." Experience has shown you all are essential. It has taught us to build engines that combine them.

BUFFALO Marine Engines have stood the test of a dozen years. They were powering boats of all kinds, just as they are today, while other builders were still experimenting with models. BUFFALOS, combining the very highest quality of design, workmanship and material, have from the very first been the standard of engine perfection in all sizes and powers, for we build not only the best engines, but

"An Engine for Any Sort or Size of Boat"



Four Cylinder Heavy Duty
24 and 36 H. P.

"Regular Type," and "Auto-Marine" BUFFALOS.

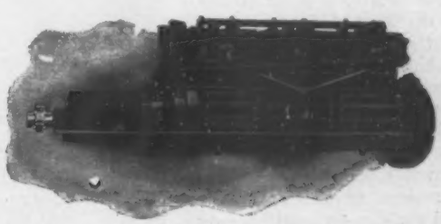
These are the most serviceable, economical, and easily managed power plant for yachts and launches of all kinds. BUFFALOS are installed in the largest cruisers; they are also powering canoes, and boats of all the sizes in between.

The "Auto-Marine" type was designed to meet the demand for a light-weight engine that would be substantial, but at the same time suitable for powering fast boats. They have in every instance given better satisfaction than the purchaser expected, and we cannot build them fast enough.

BUFFALO Heavy Duties; The Perfect Work-Engines.

BUFFALO Heavy Duty Engines have for years been helping to do the world's work. They are used in hundreds of industries where steady, unfailing usefulness is demanded, and every one of them is making good, while their field of activity is constantly expanding.

BUFFALOS are installed in cruisers and work-boats of all kinds both for motor and auxiliary power. In the fishing fleets of seven seas and all the inland waters of the world, steam engines are being replaced by the more economical, always reliable BUFFALOS.



Six Cylinder 100 H. P.
Regular Type.

"The Engine of Constant Service"

[Don't You Want The BUFFALO] Book? It's Free.

BUFFALO GASOLENE MOTOR CO.

1260-72 NIAGARA STREET
BUFFALO, N. Y.

OF INTEREST TO THE SKIPPER

A Novel, Ingenious and Effective Reversing Propeller The Gordon reversing propeller, with which Eastern motor boat men became bettér acquainted at the recent New York Show, is a radical departure from all other existing reversing propeller mechanisms. Instead of the feathering of the blades being obtained through the fore and aft motion of an outside sleeve passing through the stuffing-box, in the Gordon it is obtained by means of a rotary motion of the sleeve being transmitted through a pinion on the after end of the sleeve to pinions on the blades.

As will be seen by illustration No. 1, the fore and aft movement of the reversing lever rotates geared wheels placed at right angles to and engaging the propeller shaft sleeve, on the forward end of which is a toothed

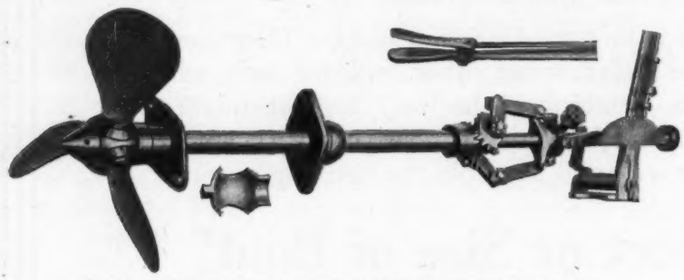


Fig. 1.—Detail of Control Outfit of Gordon Reversible Propeller.

gear wheel. This rotary motion of the wheel is transmitted inside the propeller hub, without lost motion, to the propeller blades themselves by beveled toothed gears on sleeve and blades, as shown in illustration No. 2.

The manufacturers of the Gordon propeller claim that with this rotary motion of the sleeve there is no loosening of the packing in the stuffing-box. Furthermore, there is absolutely constant leverage on the blades, with no back lash or lost motion—a certain travel of the reversing gear always giving a certain amount of rotation to the propeller blades. Not only are the Gordon propellers correctly designed so as to give the utmost power of which the engine is capable, but they are very easily installed and absolutely interchangeable down to the minutest part.

A new and improved control lever and quadrant allows the placing of the reversing lever in any part of the boat desired—a very important matter for the single-handed skipper.

Gordon propellers are built in both two and three-bladed styles, with either steel or bronze shafts. This company also make a weedless reversible propeller—weedless on the reverse as well as on the go-ahead position—something new in this line.

A very interesting illustrated book, describing the principle on which the propellers operate, and containing a table of sizes and prices, will be mailed to those mentioning that they are readers of YACHTING by the Gordon Propeller Company, 9012 Desmond Avenue, N. W., Cleveland, Ohio. Those interested in propeller outfits will find this book very instructive.

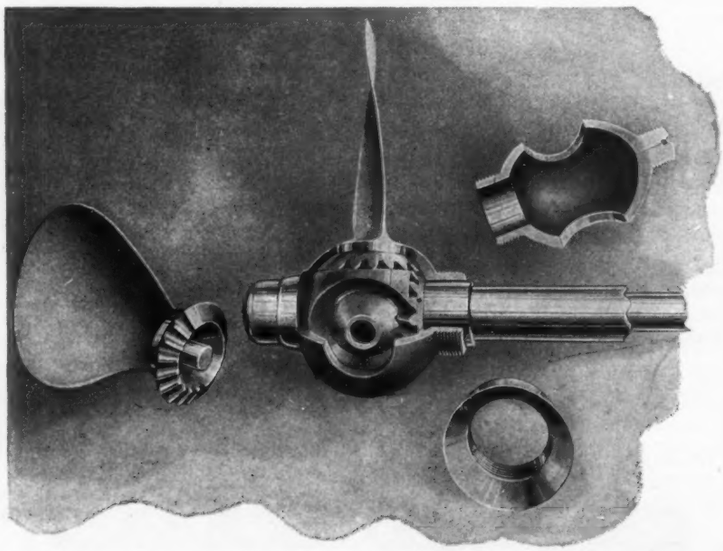
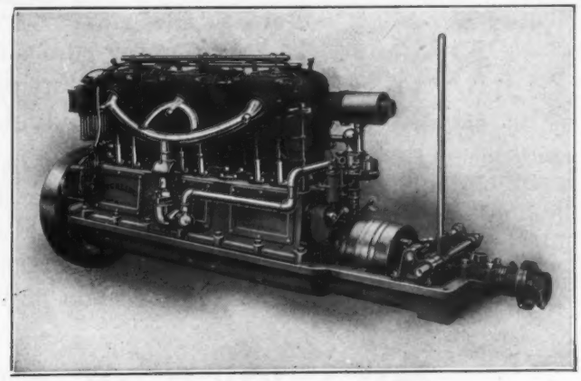


Fig. 2.—Sectional view of hub mechanism of Gordon Reversible Propeller, showing how sleeve rotates blades inside of hub.

A Sailmaker at a Motor Boat Show It looked, at first glance, to those visitors to C. D. Durkee & Company's space at the recent New York Motor Boat Show as if a woodchuck had gotten into the wrong hole, when a sailmaker was seen seated on his bench working away with a palm and needle on a piece of 10-ounce duck. But those persons who jumped at this hasty conclusion had small powers of perspicacity, as they found out when the following circular was thrust into their hands—the caption of "Don't Read This" on the outside being enough to insure its immediate perusal:

"When we look around this hall and see all the motor boats we feel that



60-horse-power, heavy-duty Sterling Engine, which ran continuously under its own power at the New York Motor Boat Show.

a sailmaker is out of place, and perhaps you think the same; but still you may want an awning or deck cover, and so we have come here to help you out. Also there may be some sports here who still cling to the old-fashioned way of sailing by wind power, and to these we guarantee not only a good looking sail but also a good place in the race, provided it is in their yacht to win. Yours truly,

"JOHN CURTIN (Inc.), 4 South Street."

The average motor boat owner hardly realizes how much he is dependent on a sailmaker for the proper equipment of his boat, but everything from spray hoods to awnings and hatch covers comes from one of these sail lofts; and just because a monkey-wrench may be a useful article on a gasolene motor it doesn't mean that sailmaking is a lost art by any means.

Another thing that John Curtin exhibited at his booth that should be of interest to every motor boat owner who contemplates going off shore or along the coast, is a sea-anchor, with folding, galvanized iron frame—a mighty convenient thing to ride to when there is any engine tinkering to be done and no bottom under you.

The Sterling Show Exhibit and a New Catalogue The 1911 New York Motor Boat Show, just closed, was one of the most successful shows ever held, and looking back to the two weeks, day and night, that Madison Square Garden was open, one is struck by the interesting exhibits. One of the most interesting of these was that of the Sterling Engine Company, of

VALENTINE'S

VALSPAR

"The Varnish That Won't Turn White"

$1,000.00 Reward

If Valspar Turns White in Water

A Spar Varnish must first of all be water-proof.

A varnish which does not resist water is no more suitable for boats and exterior work than is mosquito netting for umbrellas.

To test the water-proofness of a varnish—see if it turns white in water. This turning white is evidence of physical and chemical action.

The physical action is the penetrating of the water in minute particles into the varnish. The uneven refraction of light by the mingled particles gives a white and opaque appearance.

The chemical action is the hydrating of the oleo-metallic compounds in the varnish, soon rendering them permanently white and opaque.

Valspar will not turn white in water. And it is the only varnish that won't.

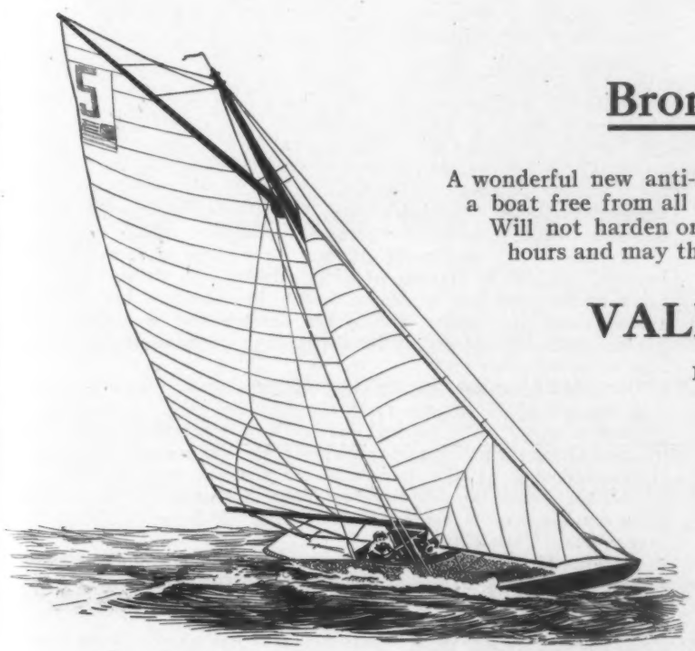
In fact, it is the only water-proof varnish made—the only one that in color, in brilliancy, in hardness and in durability, remains absolutely unharmed no matter how long or often immersed.

Valspar never hoists the White Flag!!!

We will gladly send a booklet to anyone who is disposed to investigate; also a piece of japanned tin varnished on one end with Valspar, on the other end with one of the best known Spar Varnishes.

Put it in water. The Spar Varnish end will turn white. But we will pay you $1,000.00 in cash if the Valspar end turns white!

Valspar in addition to not turning white has every other good quality that a varnish should possess, namely, good body and paleness, easy working and flowing, rapid drying and hardening, high lustre, and above all, long life.



VALSPAR
Bronze Bottom Paint

A wonderful new anti-fouling compound. Two coats will keep the bottom of a boat free from all sea life for an entire season. Mixed ready for use. Will not harden or turn green in can. Dries hard and smooth in three hours and may then be second coated.

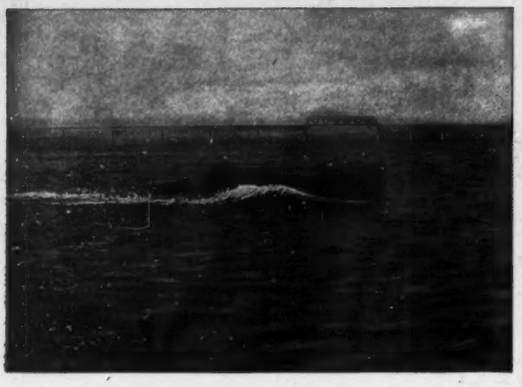
VALENTINE & COMPANY

New York—Chicago—Boston—Toronto—London
Paris—Amsterdam

TRADE VALENTINES VARNISH MARK.

W. P. FULLER & CO

San Francisco, Sacramento, Oakland, Stockton, Los Angeles, San Diego, Cal.
Portland, Ore., Seattle, Tacoma, Spokane, Wash.
Sole Agents for Pacific Slope and Hawaiian Islands.



24-footer Eclipse, of Louisville, Ky., with a 24-H. P. type G Fairbanks-Morse gasoline marine engine. She makes 21 miles per hour.

Buffalo, N. Y. At this booth an interested group of spectators stood at all times watching one of the Sterling Company's big 6-cylinder, 60-horsepower, heavy-duty engines running under its own power. A cut of this engine is shown herewith. This is essentially a slow-speed engine, having six cylinders, each 6½ inches bore by 8 inches stroke, and develops its rated power at a speed of 400 revolutions per minute. The ease and quietness of the performance of the engine were much commented upon, and gave one an idea of the perfection of design and workmanship and the advancement made in Sterling construction. It is not often one of these big engines is seen running outside of a boat, and those who did see it seemed to be greatly interested.

The Sterling Engine Company have also received from the printers and are now distributing their 1911 catalogue. This is a handsome 48-page book, very thoroughly illustrated and describing the different types and sizes of engines. It also goes into complete details regarding the different parts that enter into the construction of engines; shows their enlarged factory, and also contains pictures of a number of boats powered with Sterling engines.

One of these books will be sent free to anyone writing to the Sterling Engine Company.

Be Careful of Your Decks You can scrape your decks down to the wood, sandpaper them down to a glass finish, and then rub down between each coat of varnish, and flatter yourself that you made a good job of it, but the first time a hot, dry spell comes along the strips of the deck shrink, and the composition of putty, wood filler, and various other compounds that are so often used to fill in places between the strips, cracks and loosens. Then the next time the deck gets wet the strips swell and squeeze out the loosened putty, and all your toil has been for naught, as far as the appearance of that deck is concerned. There has, however, been discovered a composition that will stay in a deck seam for an entire season, no matter to what degree of alternate wetness and dryness, cold and heat the decks are subjected, and this composition is Jeffery's Patent Marine Yacht Glue, and the secret of the longevity of its usefulness lies in its elasticity, which allows it to be compressed or expanded without leaving the sides of the seam in which it is placed.

The glue is made in black, white, yellow and also a mahogany color—the white, yellow and mahogany look pretty, but the black glue is the best, and is guaranteed by the makers to be the really genuine sticker that relieves the owner's mind of all care as far as his seams are concerned. It is a mighty good idea for the boat owner when specifying work to be done on his boat towards getting her into commission for this season to specify that Jeffery's Marine Yacht Glue be used to pay the deck seams, or if he intends doing it himself, to write to L. W. Ferdinand & Co., 201 South Street, Boston, Mass., for a sample of the glue and direction for applying it. These directions are a highty important item, as while very simple and easily followed, they must be followed if the best results are to be obtained.

Shark, equipped with Waterman K-4, 8 to 10-H. P. motor, making 20 miles an hour on Erie Canal. (See page 350.)

Sea anchor or drag made by John Curtin, Inc. (See page 346.)

Fairbanks-Morse Marine Engine Exhibits Fairbanks-Morse & Company will hold a series of exhibitions of their marine engines at their various show rooms as follows: Indianapolis, Ind., March 20 to 25; Cincinnati, Ohio, April 1, 3 and 4; Cleveland, Ohio, April 8, 10 and 11; Louisville, Ky., April 15 to 22.

These exhibits will afford motor boat enthusiasts in the vicinity of these cities an opportunity to see some of the latest models of engines, accessories, boats, etc., and will appeal particularly to the man who was unable to attend the Boston, New York or Detroit Shows.

A very complete and attractive line of marine engines will be shown, consisting of the following Fairbanks-Morse types and sizes: 3½-horsepower, single-cylinder, and 7-horsepower, double-cylinder Type "E" engines, of the solid head, split base and three-port design; 6-horsepower, single-cylinder, 12-horsepower, double-cylinder, 18-horsepower, three- cylinder and 24-horsepower, four-cylinder, Type "G" engines, having removable heads and easy access to all working parts; and also some of the three-port design. The construction, design, principle of operation, workmanship, material, etc., of these engines will be plainly visible in two sectionalized models. These engines will be in constant operation, showing the motor under actual service conditions. In addition to these engines all the unassembled parts used in the construction will be on exhibit, so that materials and workmanship may have the very closest scrutiny.

The above-mentioned types are the well-known two-cycle medium-speed engines, but they will also show their Type "B," heavy-duty, four-cycle marine engines, as well as the Type "S," medium-duty, four-cycle engines. There will also be complete hulls on exhibit, and even if one is already an owner this part of the exhibit will appeal to him. Marine hardware and accessories will be demonstrated and displayed, such as steering wheels, bilge pumps, whistles, cleats, chocks, lighting systems, lamps, special propeller wheels, and all the little things necessary for the operation, comfort and appearance of a boat.

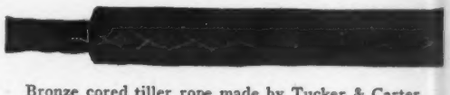
It will pay you to see this interesting exhibit even though you are not in the market, and if you are you certainly cannot afford to miss it.

Alaskan Avar Canoe fitted with 4-H. P. Gray Motor, that has covered over 5,000 miles along the Alaskan coast.

Gray Motor in an Alaskan Canoe Probably one of the strangest type of craft into which the internal-combustion motor has found its way is the Alaskan Avar canoe made by the Alaskan Indians. Mr. W. R. Hanlon, of Sitka, Alaska, who claims have the only canoe of this kind left in Alaska to-day, has equipped his craft with a 4-horsepower Gray motor, and in her has traveled over 5,000 miles of Alaskan coast and streams under the most trying conditions, towing logs, cord wood and other craft.

Through the courtesy of the Gray Motor Company we reproduce here a photograph of this strange craft, showing how he has rigged her up for cruising purposes. The picture was taken on the return from a hunting trip, and shows the native game which Mr. Hanlon bagged. The motor has given excellent satisfaction, and drives the craft at a very fair rate of speed.

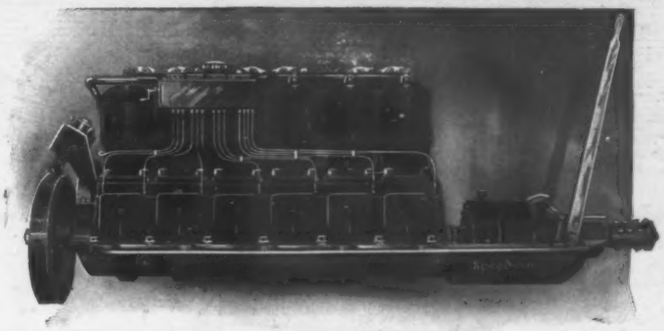
Since the first of the year the New York City agency of the Gray Motor Company has been in charge of Mr. W. C. Disbrow, Jr., at 30 Church Street, New York City, Room 307. Mr. Disbrow succeeded Mr. H. G. Diefendorf, who gave up the New York agency to go to the home office.



Bronze cored tiller rope made by Tucker & Carter Rope Co. (See page 350.)

PRE-EMINENT SPEEDWAY GASOLINE ENGINES

The Up-to-date Dependable Engine



Adapted To Any Service

Not A Fair Weather Engine

—But an engine that stands by and ready under all conditions. ¶ It's built by experts but it does not require experts to run it. ¶ Do you know that the "SPEEDWAY" engine is designed and constructed at the largest Yacht and Launch Building Plant in the World? ¶ Our vast experience in building Torpedo Boats, Gun Boats, Yachts, Launches, Working Boats and Marine Machinery has given us practical knowledge as to what is required of an engine.

The Speedway is built to meet all demands. **In Stock—Four-cycle Type, 8 to 300 H. P.**

GAS ENGINE & POWER CO. and CHARLES L. SEABURY & CO.
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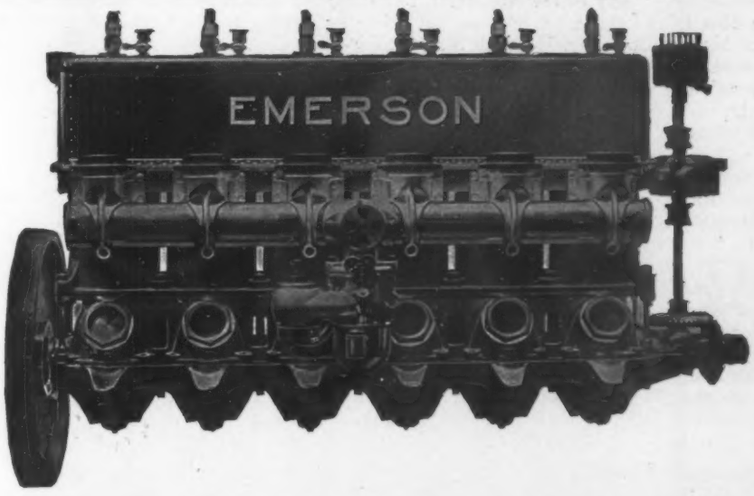
MORRIS HEIGHTS, NEW YORK CITY



Judge a Thing by What It Does

100-125 H. P. Weight 300 lbs. Thirty-six Starts in one season and Thirty-six Firsts, defeating America's best known boats. This proves whether they will stand up and what they *will* do.

We are equipping the largest lot of boats above thirty miles per hour ever produced by one firm.

Over One Hundred flights in a Heavier-than-Air Machine without a single accident. The only engine that has flown with four men and the only engine with sufficient power to alight in the snow and water and fly out again. This is the record of Antony Jannus in a Rex Smith Aeroplane at Washington, D.C., eclipsing all flying records in this or any other country.

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The Emerson Engine Co., Inc.

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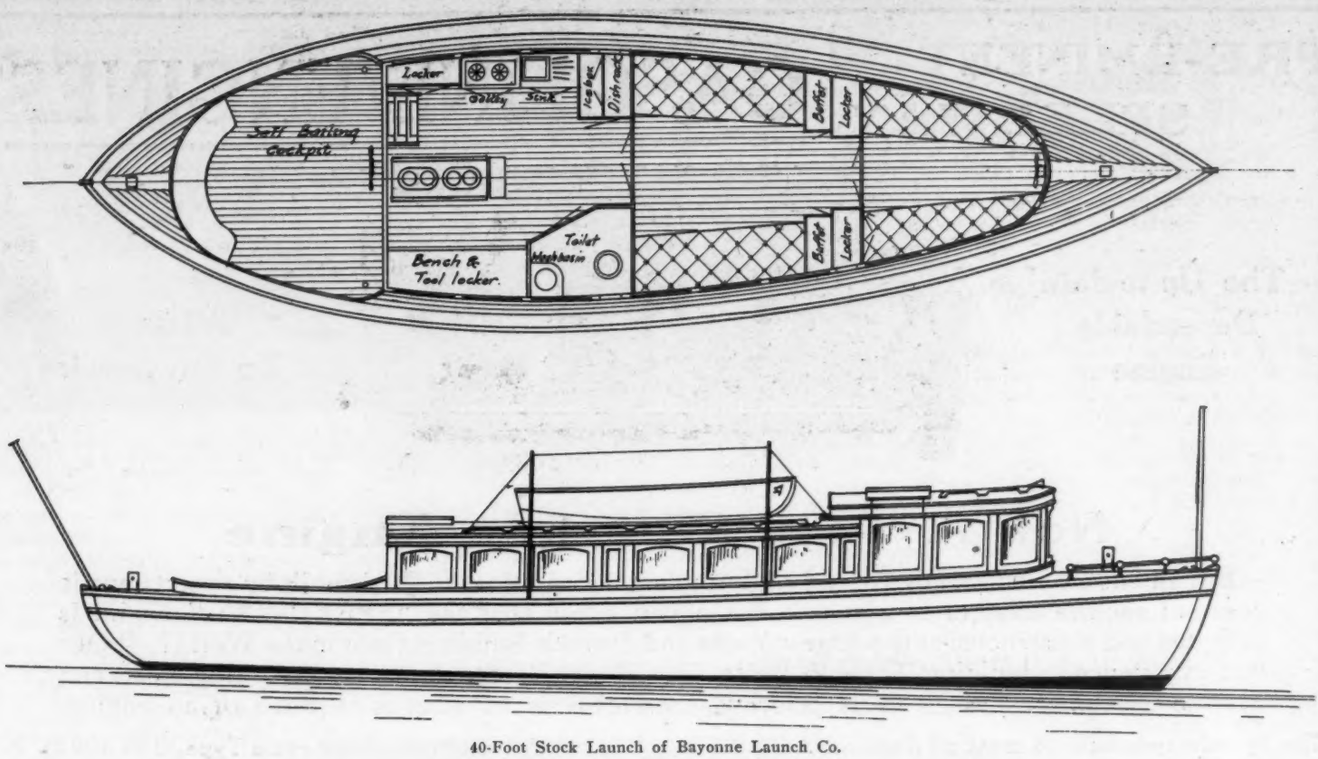

40-Foot Stock Launch of Bayonne Launch Co.

Electric Launch Company Discontinue Chicago Office The Electric Launch Company, of Bayonne, N. J., designers and builders of the well-known Elco motor boats, electric launches and Elco-A. B. gasolene engines, have discontinued their agency in Chicago with James M. Tait & Company. All inquiries for boats from Chicago and vicinity should be forwarded to the main office and works of the Electric Launch Company, Bayonne, N. J.

A Fresh Water Shark Through the courtesy of the Waterman Motor Company, of Detroit, Mich., we reproduce herewith a photograph of a small speed boat built by that company and powered with a Waterman K-4, 8-10-horsepower motor. This little boat certainly bears out its name as far as resemblance goes, and the same may be said as regards speed. A number of these models with the same size motor have repeatedly made 20 miles an hour. The photograph of the one we publish here was taken in the vicinity of Rochester, and shows the boat making that speed by a stop-watch. In fact, the speed of the boat was rather too fast for the camera. Twenty miles in a boat of this size with only 8-10 horsepower is a remarkable feat.

A Tiller Rope that Won't Break If you have ever gotten into a tight hole with your motor boat, where you had to put the wheel hard over, and felt the sickening snap of the tiller rope when the weight of the boat was thrown on the rudder, you will appreciate the value of having a rope between your steering wheel and rudder head that you can "bank" on. The majority of small boat owners make the mistake of using either a plain braided cord or one with an inferior grade of galvanized core for a tiller rope, not realizing the risks they incur by so doing. There is on the market to-day a first-class article in a Waterproof Linen Bronze-Center Tiller Rope, manufactured by the Tucker & Carter Rope Company, of 76 South Street, New York City. (See illustration on page 348.) This tiller rope, consisting of a braided cord containing a bronze core center, was patented by Mr. William A. Tucker, president of the Tucker & Carter Rope Company, the patent being later assigned to the company. This tiller rope is the strongest for its size of anything manufactured, and is particularly suitable for power boats. Before the rope is made the flax yarn is hanked and waterproofed. It is then twisted up in the size strands required, which naturally insures a waterproof cord throughout. It cannot stretch, is impervious to weather, and will give greater service than anything used for the same purpose under similar exacting conditions.

Any of the readers of YACHTING can obtain more information in regard to this rope, and can get prices by writing to the Tucker & Carter Rope Company, 76 South Street, New York City.

A 40-Foot Stock Boat The Bayonne Launch Company, of Bayonne, N. J., have turned out an excellent stock boat in a 40-foot cruiser. In this boat the designers have gone back to a modification of the glass-sided cabin, seen so frequently five or six years ago. This is a very natural change for a boat that is designed for use in more or less sheltered waters, as it insures plenty of light and air; and in a boat of this size the cabin house is low enough not to spoil the proportions of the boat. The dimensions are 37 feet long on the water, 40 feet over all, 10 feet 6 inches extreme beam and 3 feet draft. She is a big, husky boat, with good beam for her length, and has an unusual amount of space below.

There is a large self-bailing cockpit aft, 8 feet in length, on the starboard side of which a companionway leads below into the combined engine room and galley. This compartment is 9 feet long, with a stove and sink on the port side and a large toilet room with a washbasin on the starboard side. Forward of this is a main saloon, with a transom berth on either side,

(Continued on page 362.)

Br'er Fox II., which averaged 29.8 miles per hour between Cincinnati and New Orleans.

Don't Buy a Motor Boat

UNLESS YOU INSIST UPON HAVING A SEAMLESS STEEL SAFE, TANK

A Leaky Boat Is Pretty Bad But

A LEAKY TANK IS WORSE

Gasoline is mighty dangerous stuff, so when your Riveted Makeshift Tank springs a leak, and your boat is burning, just send us a wireless order

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FOR A LEAKLESS TANK

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LET US FIT YOU OUT RIGHT NOW!
Think This Over—Mr. BOAT OWNER!

Seamless Steel Leakless Tested

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Main Office—PHILADELPHIA - Branch—NEW YORK

Write for International Flag Code in Colors, Free.

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ORIGINAL LONDON

Cigarettes

Cost your dealer more—quality maintained, price raised. You pay the same.

CAMBRIDGE in boxes of ten **25c** **AMBASSADOR** the after-dinner size **35c**

"The Little Brown Box"

Both Love the Water!

THE DIVING GIRL—*and*—

Perfex

Waterproof Power-Adding

Ignition

MR. POWERBOATIST

*Why use an ignition system that is some day bound to stop your engine from spray, fog, rain, or in a storm—**when you need it most?***

INSIST *that your Engine Mfr. equip your 1911 Engine with "Perfex" WATERPROOF, POWER-ADDING Ignition--put it on your old Engine and give it new life—if you have a high-tension magneto, protect yourself against the unexpected by installing "Perfex" for one set of plugs. GET CATALOG No. 100*

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IS "FUNDAMENTALLY" DIFFERENT

Does away with sparking at the vibrator, uses no governor—makes hot fat sparks—gives 20 c. p. light. Get Catalog No. 110

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THIS IS IMPERATIVE!

ELEC. GOODS MFG. CO. LAKE AVENUE CANTON, MASS.

Driftwood from Along Shore

New Speed Boats for the Buffalo Club

The most interesting event of the month as far as the sail boat game is concerned is the announcement that Dr. E. L. Hewson, of the Buffalo Yacht Club, has purchased the Invader, owned by J. H. Fernside, of Hamilton, Ont., and will bring her here to join the yacht club fleet as soon as the weather will permit. This is the first move of many in prospect to increase the racing strength of the Buffalo Yacht Club, and those who know the plans of the club believe that the coming season will contain numerous and frequent surprises. As everyone knows the Invader is the only boat that ever won Canada's cup except the Canada herself. She is also the boat that defeated the Cadillac not so very long ago. The Invader is 53 feet long on the waterline and 50 feet over all.

Fast boats will also be added to the fleets of all the local motor boating organizations before the season begins. Commodore Levant R. Vandervort, of the Buffalo Launch Club, will have a new boat this year, equipped with a 90-horsepower, high-speed Buffalo engine. While this boat will be extremely fast, speed is not being made the first object in its construction, but rather to get a fast boat for general utility.

Among other members of the Buffalo Launch Club who will have new boats next summer is former Fleet Captain Charles S. Alt. The new boat that is being built for him is of the automobile type, finished inside and out with mahogany. She will be 28 feet long and about 5 feet beam over all, and will be equipped with a 25-horsepower Buffalo engine of the auto-marine type.

In the matter of building fast boats the Motor Boat Club of Buffalo will not be behind hand. Members boast that before the season is over the club will have the best fleet of speed boats on fresh water. Whether this will be accomplished or not it is evident that many fast boats will be added to the fleet, and there is even talk of fitting up a racing boat of the larger type at a cost of several thousand dollars to compete in most of the leading events of the country. It is also reported that Frederick K. Burnham's Intruder, now at Buffalo, will remain here through the summer, cutting an important figure in local events. The Intruder is equipped with a Sterling engine.

The American Power Boat Association has authorized the Buffalo section, consisting of the Buffalo Launch Club, the Motor Boat Club of Buffalo and the Buffalo Yacht Club, to run a cruising race for cabin cruisers during the coming season for the silver challenge cup of the American Power Boat Association. A meeting will be held soon to make the necessary plans.

C. B. McCuaig.

From Along the South Jersey Beach

VENTNOR CITY YACHT CLUB

Once more, with the backbone of winter broken, the boys are beginning to talk up the possibilities of the coming season, and from all indications it won't take long before there will be more "doings" on the old Canal.

The Isabella, Caliph, Vincent, Skibo, Nike, Julia, Hortense, Phantom, Lucille R., Louisa, Jesse Louise, Imp and Ida K. are all now being overhauled by their owners. They comprise some of the finest boats along the coast, and besides these cruisers there are many fine speed boats owned by members of the club, and several additions will slip into the water in the next month.

Caliph and Isabella II will be put in first-class racing trim this year and will go out to clean up everything in sight.

OCEAN CITY YACHT CLUB

The third annual smoker of the club was held on February 21, 1911, in the banquet hall of the Hotel Walton. A Dutch supper was served at 8 o'clock, and no expense was spared by the entertainment committee. The smoker outclassed anything of its kind ever given by the club; the entertainment was the best and cleanest that could be had, and the club's reputation for hospitality was ably maintained in the eyes of several prominent guests.

The regatta committee have about completed another big programme for the coming season. Every effort will be made to make the big Open Regatta of August 5 a part of yachting history, and the visiting clubs will never forget this event. Everybody will work this season to bring back the Schermerhorn Cup from Island Heights, and from the plans now on foot it looks like a sure thing. The boys are glad to know that Commodore Hexamer has fully recovered from his recent injuries.

CHELSEA YACHT CLUB

This club, if completed before the 1st of August, will be the social center of activity for the vast colony of Philadelphia "water bugs" who make Chelsea their summer home. And not only that, it will also have the biggest fleet of yachts and motor boats of any of the younger yacht clubs along the coast.

Commodore Swoyer is building a fast racing cruiser to compete with the Caliph and the Isabella II, and Quartermaster Smith will command a new 30-foot cabin cruiser.

SEASIDE YACHT CLUB

Following the movement to reorganize, which was started several months ago at the close of the last yachting season, the club, at its monthly meeting on the evening of March 7, completed plans to reorganize every branch of its activity and to rebuild the club house itself in the near future, and remove the present site from the westerly side of Gardiner's Basin across to the point overlooking Absecon Inlet. Assurances of sufficient financial support to rebuild the club house as soon as the land can be secured were given freely and with enthusiasm.

During the meeting the following officers were elected to serve for the season: Commodore, Charles D. Burke; vice-commodore, Walter T. Reed; rear commodore, Thomas D. Bowes; secretary, Dr. Talbot Reed; financial secretary, Ralph Harcourt; treasurer, William Maupay; regatta committee, L. Stadler, Walter T. Reed, Dr. T. Reed, Louis Bowker, H. B. Cook; measurers, Orville Crane and Harry Andrews.

If this slate is elected the old club will not only have a live bunch of executive officers but also the most noted of yachting experts in New Jersey waters.

Commodore-Elect Charles D. Burke has for many years been anxious to see Atlantic City first in the yachting world. He pledged his personal support following his nomination, and with such a powerful and energetic influence at the helm things are bound to buzz this season as they never buzzed before.

Walter T. Reed, owner of the champion Vanish, has watched over the club in its darkest days, and now with the new order of things his dream of a greater club is about to be realized. Thomas D. Bowes, who has attained the distinction of being second to none as an expert on design and other matters pertaining to the great summer sport, will be another valuable officer. The remaining nominees on the executive slate are all loyal. They are workers who will always be "on the job."

Commodore Parker, who has so long and faithfully served the club, will not be a candidate again. He retires because of business matters, which will not allow him to give all his time to the task of reorganization.

The meeting will be held in the Hotel Chelsea on the evening of April 3.

Ralph Harcourt.

Report of President, American Power Boat Assn.

During the past year the American Power Boat Association has made remarkable progress. When the present administration began its work there were enrolled in the association sixty-eight clubs, with an estimated membership of about 11,000 individuals. Some of the clubs were of doubtful status. At the present time there are 114 clubs in good standing and a registered individual membership of over 25,000. This gratifying result has not been accomplished without hard and persistent work on the part of your officers. The work of the association has not been confined, however, to the enlargement of its club list alone, but during the year just ended, at various meetings, much important, far-reaching and progressive work has been instituted, which, when fully carried into active operation, will materially advance the welfare and direction of the motor boat interests involved.

The general adoption of the standard or limited classes of boats for racing, urged by the association, alone should develop a great field of building and create a distinct class of craft that in a few years will entirely set aside the detrimental conditions that have afflicted the healthy and steady growth of moderate speed boats, intended both for safe runabouts and for racing.

The adoption of the mandatory rule of weighing boats will eliminate one of the chief sources of error by inexperienced measurers so often complained of by individual clubs during the past. The various measurements and complicated calculations will thus give way to the very simple method of weight and multiplication. It will be a very easy matter to obtain the correct weight of a boat if the rule, as given by H. J. Gielow, our official measurer, is followed. It is as follows:

"To find the weight of a boat is a very simple matter. All that is required is a couple of slings placed under the bow and stern, a couple of multiple blocks and tackles to raise her, and a couple of beam scales of any stand and types from which the two ends of the boat can be conveniently suspended. Then the sum of the two scales reading is the weight required for it, obviously, makes no difference how the total weight of the boat is divided up between its two supports. To obtain the area of the midship section, the weight of the boat in pounds is divided by 52.2 and multiplied by the prismatic coefficient, taken as 55, and by the load waterline length."

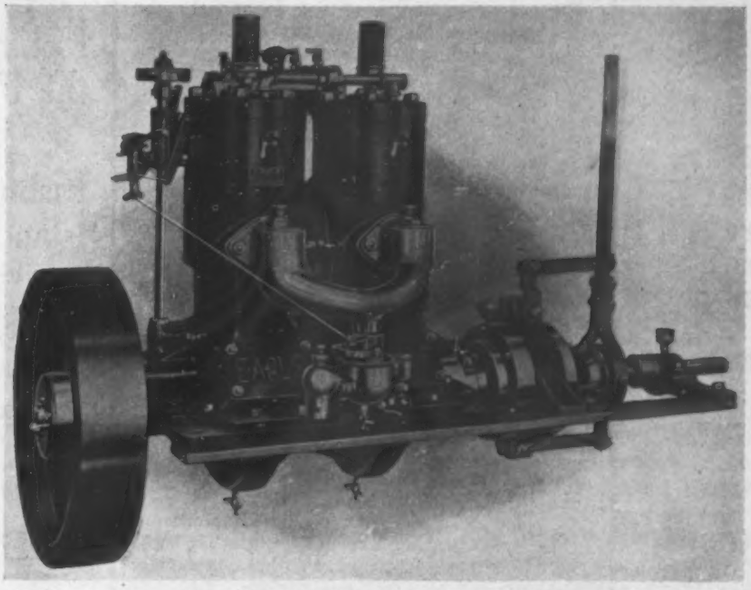
It will be seen that this method will eliminate the chief source of error and complaint in the measurements of boats, and will make it possible for

EAGLE MARINE ENGINES
DURABLE SIMPLE EFFICIENT

1911 Eagle Engines

The Engine You Have Been Waiting For
The BEST From Every Point of View

Eagle Engines are the most highly developed engines so far as design, finish, workmanship and quality are concerned so far produced. They can be bought at prices that will amaze you.



A most complete nest of Heavy Duty Eagles, with a 12-year reputation for Efficiency—our catalog, which is free, tells you all about them.

Why not place your engine business on the same basis you do your other requirements? You perhaps have a preference in hats, clothes, shoes, etc. You usually make purchases of these lines from year to year from people who command your trade by having met your requirements satisfactorily, and in whom you have confidence. The engine business is possible under the same conditions. Become associated with a manufacturer who has the capital and facilities for meeting your demands, one that is firmly established, and has been for years, and considers the engine business a permanent business. Do not lose sight of the many changes that have taken place in this industry. There are a limited number of manufacturers who have made a success of manufacturing engines. Care should be exercised in forming new associations in this respect, but when it is possible to arrange with a reputable manufacturer, *seize it*, as you will make no mistake, and results we are sure will be mutually satisfactory. Eagle engines are the last word in engine construction. They are distinguished by a rarer degree of elegance. They are of such design and construction that you will not find their equal.

Secure a copy of our new catalog, it is free merely for the asking, and really it is worth your time to make the request. You will find a great amount of information that will interest you, and take our word that it is nicely printed and handsomely illustrated.

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ELMINA II	TIMANDRA
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Regular for Cruising
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High Grade Heavy Weight Tanks

For Gasolene, Water and Air of any shape or dimensions desired for any pressure. We make only work of merit.

"Light Competition Work Not Wanted."

Galvanizing of all kinds of marine work.

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every club to accurately place its boats where they properly belong in the racing list. When once weighed their status is established, and the hitherto onerous work of club measurers is vastly reduced. At some convenient place a set of scales can be erected at a small cost which will serve the requirements of a whole locality. A small proportionate charge for weighing will amply repay the original outlay for the erection of this simple device. Your president has been requested by the newly-organized and important Buffalo section of the A. P. B. A. to secure for the Great Lakes the proposed silver perpetual challenge cup. This silver cup, which, with the gold cup and the bronze cup, will complete the special trophies authorized by our association. It will be necessary that the clubs directly interested shall subscribe the amount necessary to procure the trophy. It is hoped that upon favorable action by your body a committee will be appointed for this specific purpose, which shall have charge of the matter, including the formulating of the deed of gift and the general conditions governing the annual races.

At the special meeting held at the Thousand Island Yacht Club in August, the conditions that govern the gold cup races have been somewhat modified, to insure an increased list of entries for this annual trial for very high-speed boats. It is hoped that the officers for the coming year will be authorized to amplify the conditions still more and endeavor to make this important race a truly international meeting. This desirable change would be the initial step to secure for the A. P. B. A. the representation in the United States of all international racing events. As the national body, which in fact it is to-day, it is the proper and representative association to conduct, through one or more of its constituent clubs, all events of an international character. H. T. KOERNER, President

The Lady Maud—Schooner Yacht

(Continued from page 338.)

I made no answer to this. Though Tripshore meant no offense whatever by smiling, he had annoyed me, nevertheless, by doing so.

"Go and call Purchase up," said Sir Mordaunt to the mate, "and tell him to bring the log-book. The fellow is not too drunk, I suppose, to explain his workings," he added, aside to me.

I noticed that the mate hesitated.

"Cut along now, Tripshore!" exclaimed the baronet, impatiently. "This is an anxious time, and I must have Purchase on deck."

As the man disappeared he said to me: "I don't want those below to suspect any grounds for anxiety. My wife knows that the gale is gone, and is much easier in her mind. Ada's eyes are like a carpenter's drill. And faith, Walton, she does not need to be so sharp, either, for your face looks as full of trouble as an egg is full of meat."

"I *am* bothered," I answered. "It's a devilish bad job, Sir Mordaunt, to be with a skipper you can't trust, and whose calculations you are sure are wrong, in weather of this kind, and with those leagues of Bahama Islands dead to leeward."

Just then the mate arrived. He looked greatly worried, but without any hesitation he marched up to Sir Mordaunt and said: "I'm sorry to say I can't rouse Mr. Purchase up, sir."

Sir Mordaunt looked at him with astonishment, and then muttered, "It's *too* bad! it's *too* bad!"

"Has he been drinking since he went below?" I asked.

"He has, sir. It's not pleasant for me to peach on a shipmate, but if you'll go below, gentlemen, you'll see it all with your own eyes. He bargained for a four hours' spell, and has nipped fit to last him that time."

Sir Mordaunt took two or three impetuous strides.

"What's to be done?" he said, confronting me.

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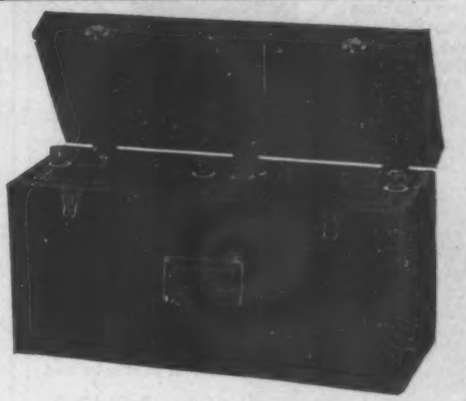

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"What's to be done!" I ejaculated, almost contemptuously, I fear. "Why, break the drunken rascal out of hand, and take care to set the Board of Trade at him when you get ashore; so that, by depriving the incompetent 'longshoreman of his certificate, you may put it out of his power to imperil human life."

My poor friend eyed me anxiously, and then turned to the mate.

"Very well," said he. "Mr. Tripshore, you will take charge of this schooner."

The man touched his cap and was about to speak.

"For God's sake let us have no refusal!" cried Sir Mordaunt, quickly. "Mr. Walton will navigate the vessel."

"The run is only to Jamaica, Mr. Tripshore," said I. "Another week of sailing at the outside, I hope. If you like, I will keep watch and watch with you. Sir Mordaunt knows I have had confidence in you as a seaman from the beginning. You owe me something for my good opinion, so oblige me by giving the baronet the answer he wants."

The man still hung in the wind; but after thinking a little he said: "All right, sir. I'll take charge. You may depend on my doing my best."

"At four o'clock the watch below will be turned up, Sir Mordaunt," said I, "and the crew had then better lay aft, that they may be told of the new arrangement."

"Certainly. Do whatever you think proper," he answered, looking harassed to death by this new bother.

I went below to consult the glass, but it offered no promise of improvement in the weather.

I took the chart again, and studied it attentively for some time, while Sir Mordaunt stood talking with Tripshore. The real trouble to me was, not being able to depend upon the observations Purchase had taken on the day before the gale. It is necessary that I should dwell upon this, that the sequel may be clear to you. Could I have been sure that his sights on that day were accurate, I should have been able to work out our position by the dead-reckoning of those stormy days, so as to come near enough to the truth. But how was I to trust such data as an illiterate seaman like Purchase could furnish me with from his sextant? A trifling error by being repeated would bring him fearfully wide of the mark in a corner of the Atlantic that is studded with dangerous reefs and low-lying islands. I own I now sincerely deplored my want of resolution in not insisting upon checking the man's calculations by observations of my own. I had acted mistakenly in suffering Sir Mordaunt to put me off discharging what was a duty owing to every person in that yacht by his weak and unwise tenderness for Purchase's "feelings." And I was also greatly to blame in not having ascertained the latitude and longitude from the steamer into which the rescued men had been conveyed. But ten years' absence from sea had very greatly disqualified me professionally, as any man may suppose; and the weight of my present responsibility was not a little increased by this sense of my deficiency.

My disposition now was to put the schooner on the starboard tack. With her head at northeast, the whole clear North Atlantic (as I then believed) would be under our bows. Yet Sir Mordaunt's unwillingness to go north when our way lay south influenced me in spite of myself, and I could not forget Tripshore's quiet smile that was like ridiculing my anxiety.

All this time the mist remained abominably thick, and blew along our decks in a kind of smoke. The swell was greatly abated, but the heads of the seas as they arched out of the vapor broke quickly, and with a certain fierceness, and poured in foam against our weather bow. With her housed topmasts and streaming decks she

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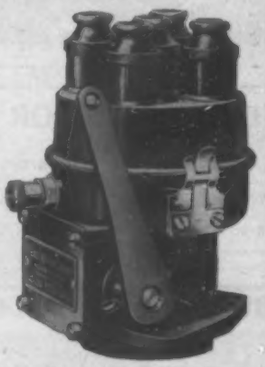

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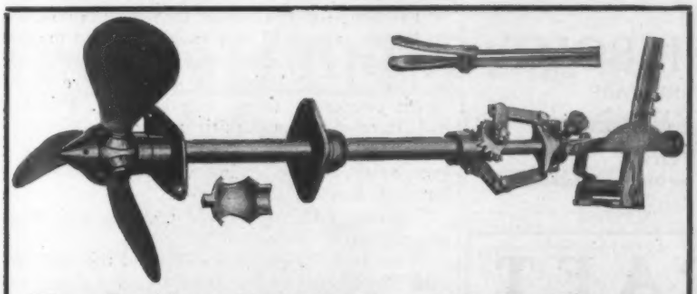

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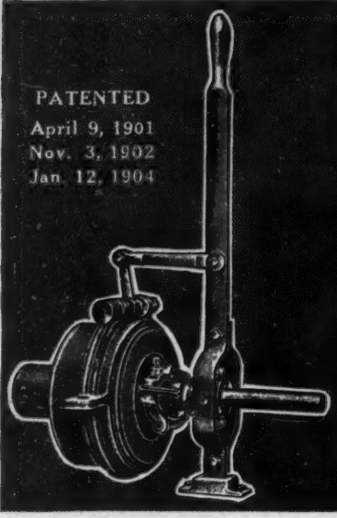

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looked more to be struggling round the Horn than ratching in July upon the Western Atlantic.

At four o'clock the watch below was called. Tripshore came to me and asked respectfully if I meant to stand Purchase's watch. I answered that I had offered to do so, and was quite willing to keep my word.

"I've been turning it over in my mind, sir," said the mate, "and I doubt if the men 'ud feel quite easy. You know what sailors are, sir. The crew have been taught to think of me and Mr. Purchase as their bosses, and of you as passenger."

"Who'll take turn and turn about with you, then?"

"There's Bill Burton, sir. Bill's our oldest hand, and a good man. The men 'ud mind him."

Sir Mordaunt, who stood near, said: "As you are to navigate the yacht, Walton, it is only right that others should do the practical part. Tripshore takes Purchase's place, and so let Burton take Tripshore's, if, as you say"—to the mate—"he is the best man."

"I'll warrant Bill Burton as a steady man, sir," said Tripshore.

"Let us consider that settled," exlaimed Sir Mordaunt. "And now the men should be told of the change. Send them aft, Tripshore, or the watch below will be turned in." And as the mate went forward the baronet added, "Will you talk to them, Walton?"

"They'd like it better from you," said I. "You pay them. You are their master."

"Very well," said he, and he fell to stroking down his beard while he thought over what he should say to them.

In a few minutes they were all assembled. Most of them were in oil-skins, which glistened with the wet, and they stood looking eagerly—this being a novel summons indeed, and they could not imagine what it meant. Sir Mordaunt coughed and fussed, and then rapped out:

"I've sent for you to say that Mr. Purchase is no longer captain of this yacht. At this moment he is drunk in his cabin, and incapable of coming on deck. I don't believe he knows where we are within twenty or thirty leagues. Mr. Tripshore will have command until we reach Kingston. Meanwhile, he will want somebody to help him to keep watch, and so I select William Burton. Step forward, Burton."

The man addressed made a stride, and looked around much astonished.

"You and Tripshore will head the watches," said Sir Mordaunt, "and I'll trust to your being a smart seaman, to keep a bright lookout, and help us all to bring the Lady Maud safely to an anchorage."

"I'm willing to obey any orders, sir," said the man, who was a short, thickset, intelligent-looking fellow.

Just then old Purchase made his appearance. He stood a short distance before the mainmast, holding on to the little companion that led to the part of the vessel where his cabin was. The absorptive power of his "bibulous clay" had drained the liquor away from his head; but it was easy to see that he was by no means yet recovered, and it looked as if the sight of Sir Mordaunt made him unwilling to trust his legs. The crew were not conscious of his presence, but we who looked forward saw him at once.

Tripshore sidled up to me and whispered: "He lay like a dead man when I tried to rouse him up. But he can smell anything going on, and he knows how to pull himself together."

It was probably the seeing Tripshore edge up to me and mumble in my ear that made old Purchase roar out violently, "How was it no one called me at eight bells?" and knitting his brows and looking very fierce, he let go his hold of the companion, and came lurching along toward us.

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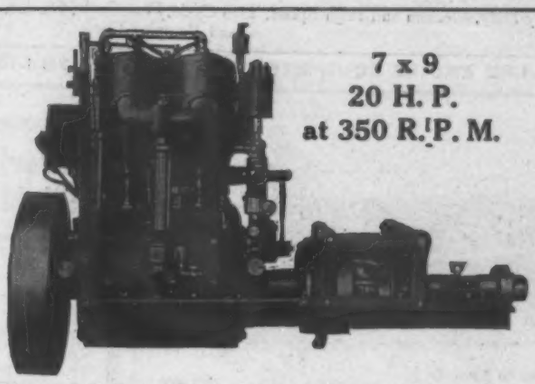

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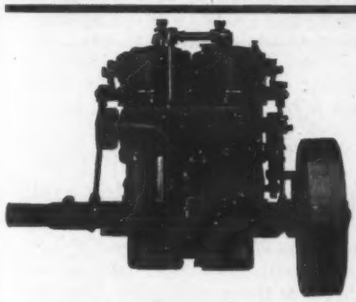

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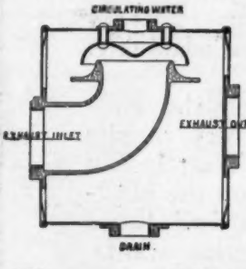

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NO CATALOGUES

At the sound of his voice all the men looked around. He stopped after making a few strides, and planting himself on his legs by setting them wide apart, he roared out again to Tripshore to explain why he hadn't called him at eight bells.

"I'll answer you," exclaimed Sir Mordaunt, dropping his head on one side and raising his arm. "When some time ago the mate went to your cabin to tell you I required your presence on deck, he found you too drunk to wake up."

"Me!" said the old fellow, putting on such a face that in an instant half the crew were broadly grinning. "Me—Purchase—too drunk to wake up?" He tapped his breast and fell back a step. "No, no," says he, smiling foolishly and looking round him; "this here's some skylarkin' of Ephraim Tripshore's. Tell Sir Mordaunt it's a bit o' tom-foolin', Ephraim. Lor' bless ye, I never was drunk in my life."

"You're drunk now," cried Sir Mordaunt, warmly, seeing nothing diverting in this exhibition. Indeed, all the time he was incessantly glancing behind him at the skylights and companion, as if he feared that some echo of what was passing would reach his wife's ears. "You are superseded, sir. I shall discharge you at Kingston, and perhaps prosecute you for this conduct. You are utterly unfit for the responsible position you have filled. Go back to your cabin, sir. I have given the command to Mr. Tripshore, and William Burton will assist him. We shall manage very well without you, and a deal better than with you. So go below, Mr. Purchase, and don't let me see your face again, sir.

All this was delivered with an energy that surprised me in my friend. No doubt it was the nervous irritability induced by the worries, anxieties and dangers of the past few days, and our present uneasy condition, that enabled him to rap out so smartly. The men were astonished at this vehemence in their mild-mannered master, but old Purchase was absolutely confounded. After the baronet had ceased, he stood staring at him with his mouth open; then slowly rolled his eyes around on the faces of the men, as though he would persuade himself by an inspection of their whiskered faces, ashine with the muggy, lukewarm, driving drizzle, that he was not in a drunken dream; and turning, he managed to scull himself along and swing down the companion steps amid a half-suppressed shout of laughter from the crew.

(To be continued.)

Southward Under Powder and Sail

(Continued from page 334.)

breeze, which held until we were off the jetties at St. Mary's entrance. About dark we could see the lighthouse at the mouth of St. John River, so we started our engine to try and get in before dark, but were unsuccessful, it being nine o'clock before we finally anchored for the night. As we entered the river we saw two black objects on each side of us at the end of the jetties, and upon approaching saw that they were two wrecked vessels that had been thrown upon the rocks of the breakwaters while trying to enter the river in a heavy sea.

We were now about twenty-five miles from St. Augustine, where we could get the inside route again to the Gulf (the part from Mayport to St. Augustine not then being open), and wanting to make there before dark we were under way the next day before breakfast. Being favored with the same sailing breeze we had had the day before, we reached St. Augustine Inlet about noon, entering without trouble, though we had to climb our mast again to follow the deep blue water indicating the channel. On reaching the town we anchored in Matanzas River, off the St. Augustine Boat Club.

(To be continued.)

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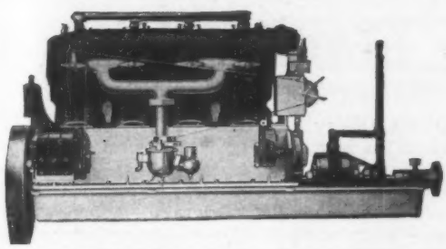
BREAK away from the thoughts of the office, the shop, the store, and put your mind for a few moments on the sunny days in the open that are just waiting around the corner for the man with a motor boat. No matter how many cares, not matter how thick the worries come, the wind that blows across the bow of your little craft will sweep them all away. A turn of the wheel, open the throttle, take hold of the tiller, and away we go, dancing across the sunlit water, cutting the little waves in two, and leaving a wake that marks the swiftly disappearing path behind us. That's life in a motor boat.

Of course, there's one care that comes to some boat owners, the care of a balky engine. But, a little thought now can save you all the trouble, the trouble that might spoil future days of delight. A little care now in selecting your engine will be an insurance against troubles when you don't want them.

Avoid the cheap, hastily built engine, like a pestilence. Get a good engine at a fair price—an engine like the **SCRIPPS** is what we advise—but, **by all means a good engine.**

The way that Scripps owners speak of Scripps Motors—the careful, unusually painstaking attention given to every detail of their construction, makes us positive that you can get no better engine. But, don't take our word for it, Look over a Scripps Motor before you buy. Send for a Scripps catalogue, and learn how well and how carefully they are made. Let us tell you the name of the nearest Scripps dealer—and then have a talk with him. After that—don't let what we say influence you—use your own good judgment. We believe your judgment will say "I'll buy a Scripps."



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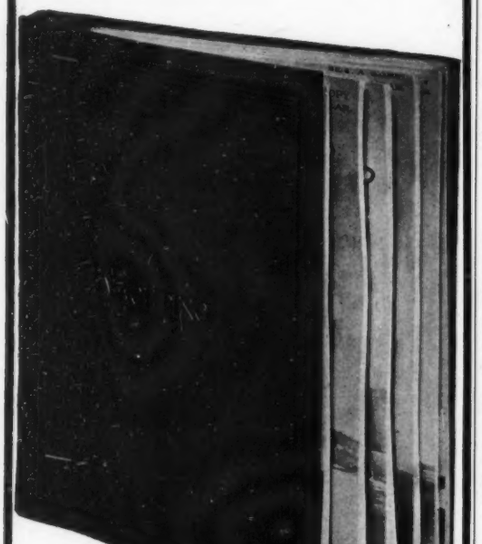

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Ignition Systems

(Continued from page 320.)

cough, gasp a few times and stop altogether when running along after dark, and then found it necessary to air the cabin thoroughly before bringing in the lantern and working with the light as far away as possible, for fear of a possible accident that might cost more than a dozen electric lighting systems. With a small hand-lamp, however, on the end of a drop cord, which can be switched on from a button, the examination and adjustments may be conducted with perfect safety, and with a good light thrown directly on the part that is giving trouble.

All of these conveniences can be obtained at a nominal cost, and, in a small installation can, if desired, be properly installed without the necessity of employing an expert electrician. On the small cruiser up to 35 feet over-all length a six-volt system can be used, and would be the least expensive to install, as the necessary parts are limited to a small storage battery of six volts and 80 to 100 ampere hours capacity, a dynamo of 8 or 9 volts and 10 amperes, an automatic switch, an ignition switch, a lighting switch and the necessary amount of wire to connect these together and to the lighting circuits.

First, the number of lamps and location of the same as well as the size in candlepower of each should be decided upon. An 8-candlepower lamp is sufficient for passageways, toilet and pantry, while 12-candlepower lamps will be amply large for the saloon or main cabin. The wiring of the lamps should be run of the best grade of double rubber-covered No. 14 B and S gauge wire.

Tungsten lamps instead of carbon lamps should be used, as about twice as many of the former may be installed with the same capacity of dynamo and storage battery, the tungsten lamps consuming about 1¼ watts per candlepower per hour, against a consumption of 3½ watts per candlepower by the carbon lamp. (A watt is an ampere multiplied by a volt.) If six lamps of 8 candlepower each and two lamps of 12 candlepower each are decided upon, the watts consumed would be 6 x 8 or 48 candlepower and 2 x 12 or 24 candlepower, making a total of 72 candlepower, and at 1¼ watts per candlepower equals 90 total watts. This consumption of 90 watts divided by 6 volts equals 15 amperes, with all of the lamps burning. A 3-cell, 6-volt, 80-ampere-hour storage battery of the pasted plate type will give 16 amperes for 5 hours, but as all of the lights would not be used at one time for a much longer period than, say, one-half hour, the battery, if fully charged at the beginning, would still have about nine-tenths of its capacity left after the half-hour's burning of all the lights. As a matter of fact, it seldom occurs that all of the lamps are lighted at one time, and the lower the discharge rate in amperes the greater the capacity is of the storage battery.

For the above-described outfit a generator can be selected of 8 volts and 10 amperes, either geared to a shaft or belted to the fly-wheel, gearing being preferable.

It will be seen from the above that where a dynamo and a storage battery are used for the ignition work, the small additional cost for the automatic switch, wiring and lamps, the circuit switch and the slightly larger storage battery capacity will provide a satisfactory lighting plant.

Of Interest to the Skipper

(Continued from page 350.)

besides buffet and hanging lockers. Next forward is the pilot house. This has transoms on either side, and can be entirely shut off from the saloon, making a separate stateroom. Entrance may be had to this pilot house from the deck by a hinged hatch opening on the starboard side. With a 20 to 25-horsepower engine 9 to 10 miles is expected.

Fox Motors and Br'er Fox II We show herewith an illustration of the famous racer, Br'er Fox II, which the Dean Manufacturing Company exhibited at the Boston Motor Boat Show, and which made the sensational run from Cincinnati to New Orleans last year in the remarkable actual running time of 53 hours 25 minutes and 58 seconds, or at the average of 29.08 miles per hour.

Fox medium-duty motors are made in nine sizes, with Fox fourth-port accelerator. The addition of the fourth port gives an increased speed of 10 per cent and a corresponding saving of 10 per cent in fuel if the engine is run at the same speed. The Fox fourth port is patented and used only on these motors.

Fox Specials, three port, are built in two sizes for small boats from 16 to 22 feet, for which they are ideal power. They are low priced, but by no means cheap in construction or equipment.

Fox heavy-duty motors, two port, are built in four sizes, and are especially adapted to the use of fishermen, oystermen, lobstermen and for ferrying, towing and commercial work in general. They are equipped with the waterproof ignition system, combining the advantages of the jump-spark and the make-and-break system.

Fox De Luxe motors, built in seven sizes, are also equipped with Fox fourth-port accelerator, and, as the name implies, they are built De Luxe throughout, including high-tension magneto, copper water-jacket, aluminum case, and for aeroplane work include radiator mounted on the engine and fan and circulating water pump.

An Easy Way to Align the Motor One of the meanest tasks connected with installing the motor in a boat is lining up engine and shaft. It requires care, time and no little amount of mechanical skill to insure that there shall be no binding and that both engine and shaft shall be absolutely true down to hundredths of an inch. And after hours of work, putting in a shim here and reducing a shim there and getting everything absolutely right so that the propeller shaft, when connected to the engine, shall turn over easily, while the boat is on the ways, the job has to be practically repeated when the craft goes overboard, because the difference between the shape of a boat supported on the ways from a few points of the hull is a very different thing from the shape of the same hull when its weight is distributed over the entire underwater surface. Even though the alignment is perfect while the boat is at rest, the moment her propeller pushes her against the resistance of the water another form of distortion sets in. The old style rigid stuffing box being a fixed factor with the hull, is thrown out of line with the shaft by the distortion, with consequent binding and undue wear.

There is no excuse for this sort of thing now, however, since a little device—by name, the Walters Flexible Shaft Coupling—has come into use. This device works at an angle, just like a universal joint, and works equally well even if the two shaft ends are badly off center, either vertically or horizontally. When used in connection with an automatic aligning stuffing box and an adjustable shaft hanger it is the easiest thing in the world for even the most inexperienced to install the engine and shaft so that there is no binding, friction or trouble.

These devices, which are a godsend to the boat owner and the amateur builder of knockdown craft, are used throughout the country by the best boat builders, because automatic alignment is now known to be the proper thing, and these devices save them time and money. The Mechanical Devices Company, of Watervliet, New York, will send to any reader of YACHTING their illustrated descriptive price list upon request.

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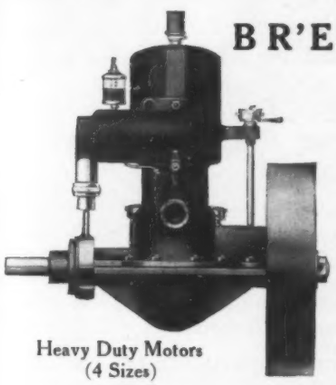

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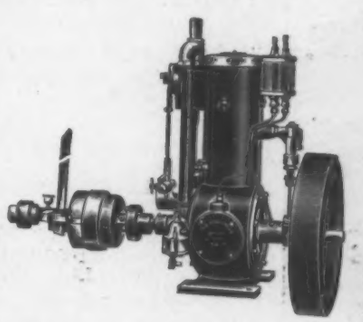

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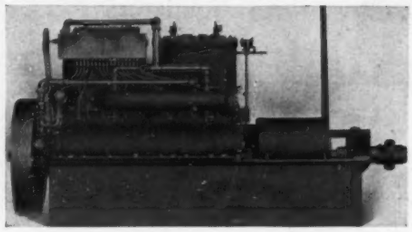

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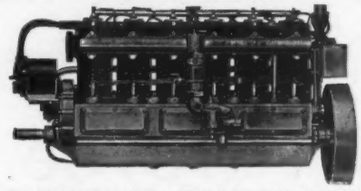

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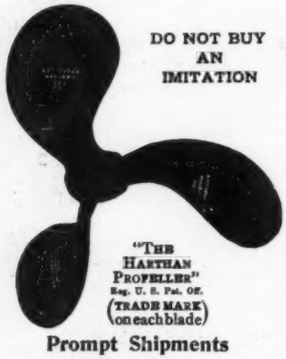

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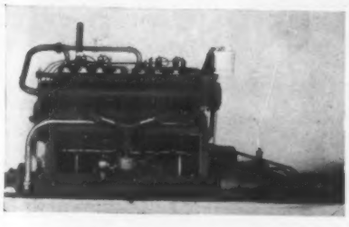

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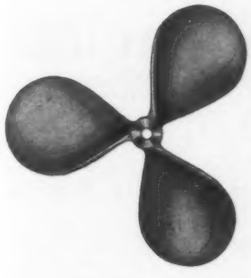

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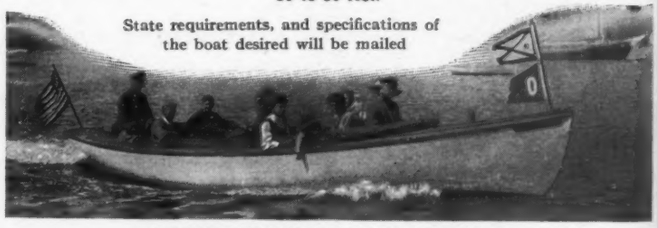

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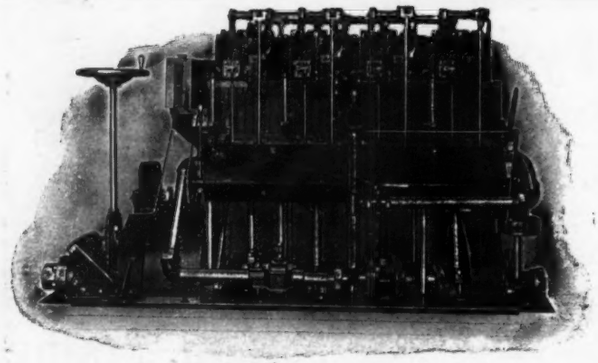

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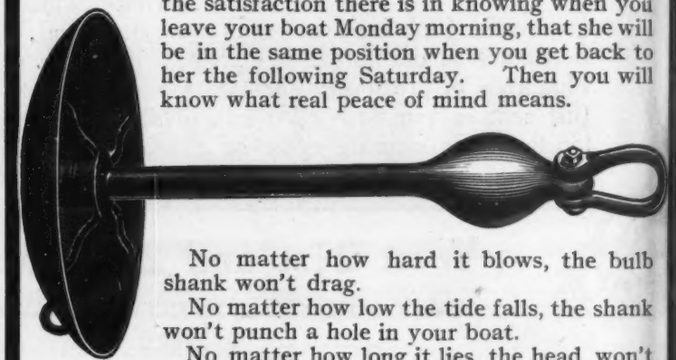

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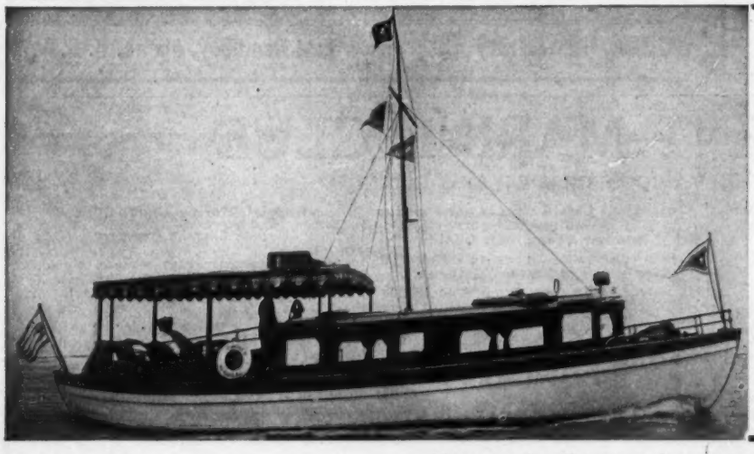

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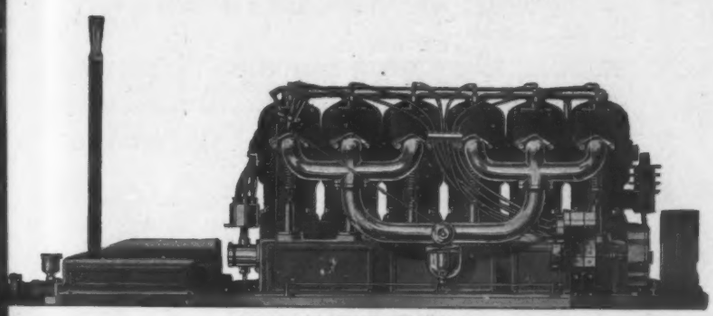

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INDEXED LIST OF ADVERTISERS

	PAGE
Alcohol Utilities Co., The	369
Alden, John G.	288
American Ever Ready Co	370
Armstrong Mfg. Co.	354
Atlantic Co., The	368
Automatic Bilge Bailer Co.	293
Barney, Morgan	288
Bayonne Launch Co.	372
Bonney, John C.	289
Borsum Bros.	373
Boston Varnish Co.	369
Bottger Bros.	356
Boucher Mfg. Co., H. E.	374
Bowes & Mower	288
Bridgeport Bronze Marine Paint Co.	291
Browne, Harold W.	358
Bruns, Kimball & Co.	289
Buckport Launch & Engine Co.	364
Buffalo Gasolene Motor Co.	345
Burgess Co., Ltd., W. Starling	288
Burgess, Chas. P.	288
Burgess Yacht Agency, Hollis	289
Camden Anchor Rockland Machine Co.	359
Carpenter & Co., Geo. B.	293
Cluett, Peabody & Co.	Back Cover
Columbian Brass Foundry Co.	373
Commercial Acetylene Co.	363
Connolly, Jr., John A.	289
Cox & Stevens	282, 284, 288
Craig, James	368
Curtin, Inc., John	372
Cutler Clamp Co., The	356
Davis Boat Works	360
Dayton Electrical Mfg. Co.	368
Dayton Engineering Laboratories Co.	357
Dean Mfg. Co.	363
Devoe, F. W., & Raynolds, C. T.	365
Diem, Gus A.	366
Doman Co., The H. C.	359
Durkee & Co., C. D.	363
Eagle Co., The	353
Edson Mfg. Co.	368
Electric Goods Mfg. Co.	351
Electric Launch Co.	Inside Front Cover
Electric Speedometer Co.	291
Emerson Engine Co.	349
Emery, V. J.	366
Evinrude Motor Co.	293
Fairbanks-Morse Co.	290
Fairhaven Iron Foundry Co.	372
Fay & Bowen Eng. Co.	366
Ferdinand & Co., L. W.	371
Field and Stream	358
Fogg, M. W.	360
Gardner, William	288
Gas Engine & Power Co.	285 and 349
Gasolene Engine Equipment Co.	360
General Machinery Co.	291
Gielow & Orr	281, 288
Gordon Propeller Co.	357
Grand Rapids Gas Engine & Yacht Co.	289
Gray-Hawley Mfg. Co.	363
Gray Motor Co.	294
Griffin, W. H.	375
Haddock, R. M.	288
Hand, Wm. H.	288
Heintz Art Metal Shop	356
Herbert & Huesgen	356
Herzig, A.	362
Higgins & Seiter	371
Holmes Motor Co.	367
Homer, Arthur P.	287, 288
Hyde Windlass Co.	367
Insurance Co. of North America	367
Janney, Steinmetz & Co.	351
Jencick Motor Mfg. Co.	358
Jones & La Borde Co.	358
Kiggins, Wm. P.	288
Koven & Bro., L. O.	354
Krice Carburetor Co.	373
Legnard Bros.	356
Leitz, Ernst	365
Life Publishing Co.	364
Loew Mfg. Co.	373
Lowell Weaving Co.	354
Luders Marine Construction Co.	374
Malleable Iron Fittings Co.	369
Manning's Yacht Agency	286-288
Martin & Martin	370
McFarland Foundry & Machine Co.	366
Mechanical Devices Co.	362
McKibbin, Geo. N.	362
Michigan Wheel Co.	368
Monarch Typewriter Co.	293
Montgomery & Co.	364
Morris & Co., Philip	351
Motor Vehicle Pub. Co.	[illegible]
Murray & Tregurtha	[illegible]
Negus, T. S. & J. D.	[illegible]
New York Gear Works	[illegible]
Nock, Frederick S.	[illegible]
Old Town Canoe Co.	[illegible]
Outing Pub. Co., The	[illegible]
Owen, George	[illegible]
Packard Electric Co.	[illegible]
Peterson, Julius	[illegible]
Photographic Topics	[illegible]
Photo Era Magazine	[illegible]
Pioneer Boat & Pattern Co.	[illegible]
Pneumatic Mfg. Co.	[illegible]
Rice Bros. Co.	[illegible]
Robinson & Co., G. W.	[illegible]
Rod and Gun Magazine of Canada, The	[illegible]
Royal Engine Co.	[illegible]
Scripps Motor Co.	[illegible]
Seaman & Huntington	[illegible]
Smith & Ferris, Cary	[illegible]
Smith & Wesson	[illegible]
Specialty Mfg. Co., The	[illegible]
Splitdorf, C. F.	[illegible]
Stamford Foundry Co.	[illegible]
Stanley & Patterson	[illegible]
Stearns & McKay Co.	[illegible]
Sterling Engine Co.	[illegible]
Strellinger Marine Engine Co., The	[illegible]
Tams, Lemoine & Crane	[illegible]
Termaat & Monahan Co.	[illegible]
Thermex Silencer Works	[illegible]
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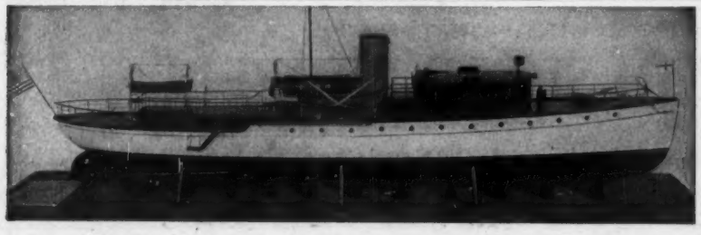

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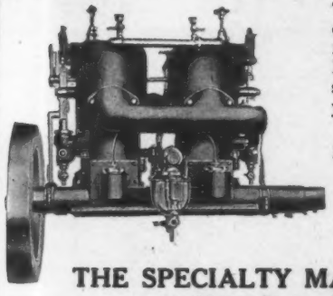

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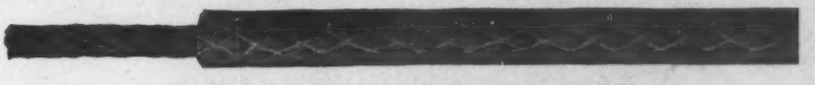

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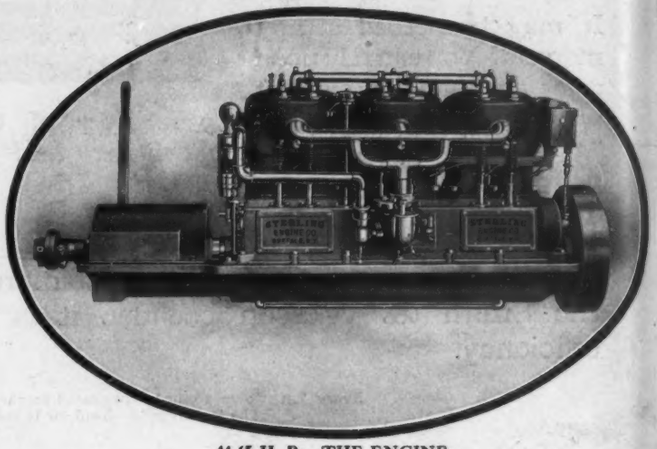

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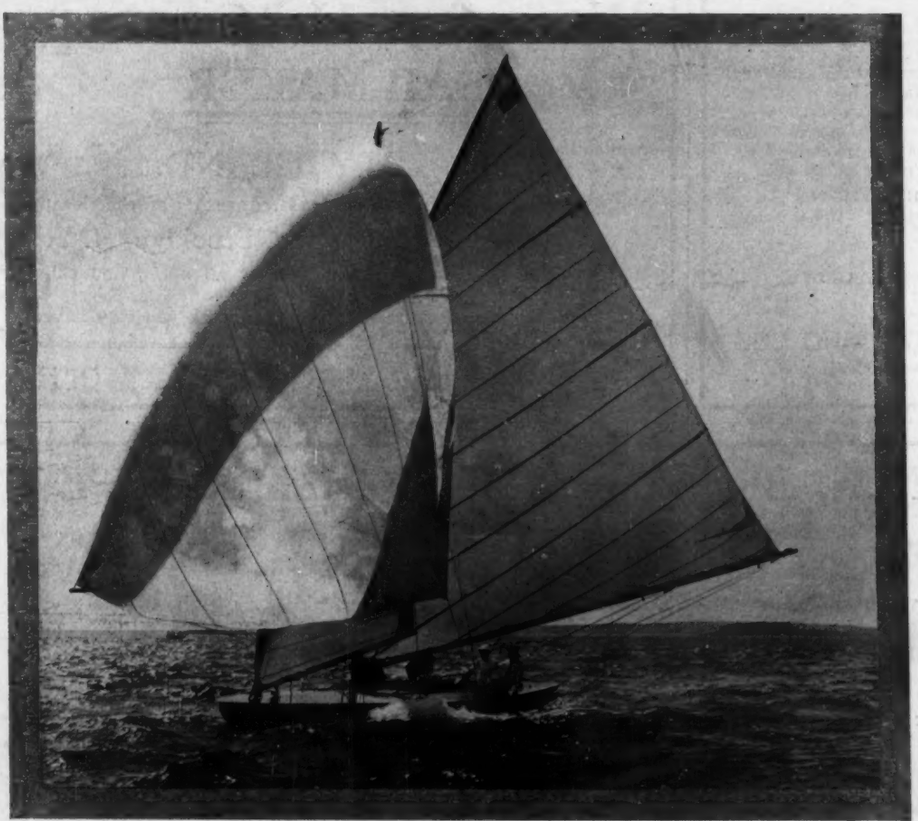

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